

NAVAL POSTGRADUATE SCHOOL

Monterey, California



THESIS

**THE EFFECT OF A MILITARY FAMILY
BACKGROUND ON MIDSHIPMEN
PERFORMANCE AT THE UNITED STATES
NAVAL ACADEMY AND USNA GRADUATE
PERFORMANCE IN THE FLEET**

by

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March 1999

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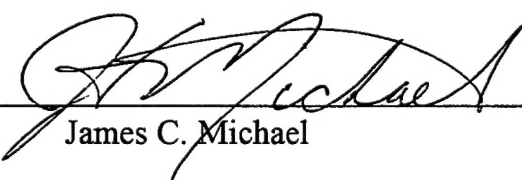
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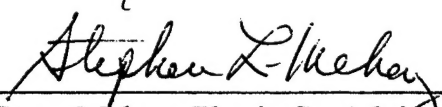
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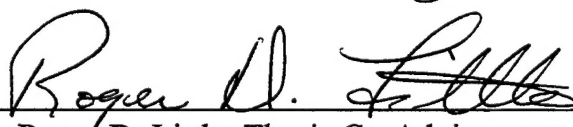
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ABSTRACT

This research analyzes USNA and fleet performance of midshipmen who come from career military family backgrounds. It is hypothesized that a military family background provides children with values that help them succeed at the Academy and in the Fleet. This thesis uses USNA classes of 1988 - 1992 to judge performance at the Academy and USNA classes of 1980 - 1985 to measure fleet performance.

In analyzing the USNA performance data, linear regressions and non-linear LOGIT models were estimated. Each was based upon the Academy's "whole-man multiple" with an additional variable used to represent the presence of a career military family background. Performance was measured in terms of USNA graduation rates, attrition rates, and final aggregate multiples. In judging officer performance, retention rates to the LCDR boards and career promotion rates to LCDR and CDR were examined.

Results suggest that a military family background is significant in determining success at the Academy and in the Fleet. However, more research will be needed to adequately assess the true effect of a military family background.

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I. INTRODUCTION

It is by no means enough that an officer of the Navy should be a capable mariner. He must be that of course, but also a great deal more. He should be as well a gentleman of liberal education, refined manners, punctilious courtesy, and the nicest sense of personal honor.

John Paul Jones

A. BACKGROUND

The United States Naval Academy remains one of the nation's truly selective four year institutions. Each year as many as 15,000 applications are received for a class size of about 1,000 students. It is the job of the Naval Academy admissions board to select the applicants who are the most qualified and have the greatest desire to make the navy a career. This thesis explores the use of the whole-man multiple in selecting applicants for admission to the Naval Academy and is a follow-on of Reardon's earlier study of candidate admissions criteria.¹ However, this thesis investigates more closely one aspect of the Naval Academy admissions area that was identified as significant in his analysis, namely, the effect of a military family background on graduation. A second difference is that Reardon analyzed data from the 1980 to 1985 USNA graduation classes, while this thesis includes more recent data in an effort to establish a continuation of Reardon's findings to more recent graduating classes.

The Academy's selection process has refined itself from the single comprehensive exam used during the first years of the "Naval School" in 1845 to today's "whole-man multiple" system. Because no single trait predicts success as a midshipman and as an officer,

¹ Reardon, M. "The Development of Career Naval Officers from the U.S. Naval Academy: A Statistical Analysis of the Effects of Selectivity and Human Capital." Master's Thesis, Naval Postgraduate School, Monterey, CA. June, 1997.

the whole-man multiple system is designed to incorporate a broad range of qualities that are indicative of success at the Academy and in the Fleet as Navy and Marine Corps Officers.

The Naval Academy primarily uses the candidate's high school rank in class and SAT scores to measure academic suitability. In order to determine a candidate's interest in a naval career, the admissions board reviews recommendations from the candidate's teachers, personal statements and results from the Strong-Campbell Interest Inventory form.

According to law, Naval Academy admissions must select candidates from all fifty states. This diverse applicant pool guarantees large differences in familiarity with the naval service among candidates. Obviously, candidates from areas with a large concentration of naval personnel are probably more familiar with the Navy than candidates from the interior United States.

Despite the high academic achievements of each entering academy class, approximately 25 percent fail to graduate four years later. The majority of individuals who do not graduate leave the Academy before their junior year. Midshipmen who resign before their junior year incur no obligation or penalty from the Navy. However, those who separate after the start of their junior year may be obligated to reimburse the Navy for the cost of their education to that point.

Attrition of midshipmen can be divided into three general areas: 1.) poor academic performance, 2.) voluntary resignation, and 3.) conduct deficiency. Voluntary separations may occur because of a midshipman's inability to adapt to college life, a dislike for the military, a change in professional desires or for other personal reasons. Midshipmen who separate during their plebe year often do so because their expectations of the Naval Academy

and the reality of the Naval Academy are not compatible. Those midshipmen who leave the Academy after two years are largely unsure about their desire to serve in the Navy for the required minimum commitment and opt to leave the Naval Academy without obligation. Although attrition may be beneficial in terms of eliminating individuals unsuited for a military career, it still equates to lost training dollars.

The purpose of this thesis is to examine demographic and personal background characteristics that, in addition to the whole-man multiple, are associated with success at the Naval Academy. A hypothesis in this study is that midshipmen from military families have a better understanding of military life and its requirements. Consequently, other things being equal, they should exhibit lower separation rates at the United States Naval Academy and in the Fleet.

The Naval Academy is also concerned with the military familiarity of its candidates and their desire for a military career. For example, the Naval Academy hosts a voluntary summer seminar and an orientation program during the academic year for prospective candidates. The goal of each program is to reduce voluntary attrition rates by allowing candidates to visit the Academy and receive a "snapshot" of academy life. In fact, the admissions board grants additional points to prospective candidates on a case by case basis based upon their attendance at one of these two programs.² In addition to candidate familiarity with the Naval Academy, the admissions board also considers the candidate's desire for a naval career. The Strong-Campbell Interest Inventory (SCII) is a questionnaire

² Pantelides, N. Admissions Board Secretary. Interview by the author. December 11, 1997.

designed to measure a candidate's technical interest and career interest. The scores from these two sections are used to calculate part of the whole-man multiple.

In some respects, if the first half of the Academy's goal is selecting candidates who will graduate, the second half is graduating officers with a desire for a naval career. However, only four percent of the whole-man multiple is determined by the candidate's career interest score.

While the previously mentioned thesis by Reardon examined the effects of selectivity and human capital in the development of career naval officers in general,³ this thesis will expand on his idea of selectivity and define a preselection process hypothesized to hold with candidates from military families. Such candidates, because of their socialization and enculturation may better understand the requirements of military life and would be expected to have lower attrition rates from the Academy. Although Reardon defined human capital as qualities that were added by the organization, this thesis views human capital as the familiarity with the military culture that midshipmen from military families might possess. This familiarity may provide them with fuller and more accurate information about the Academy and military life, which may translate into higher graduation rates from the Academy and higher retention and promotion rates in the Fleet.

Children of career military families have had experiences which may provide information to help in deciding whether or not to pursue a military career. Those with positive experiences may be more inclined to pursue an appointment to a service academy and

³ Reardon, M.

may have stronger desires to graduate than children from civilian families. In contrast, most potential candidates from civilian families have little or no firsthand experience with the military, and may be at a disadvantage in terms of what to expect from academy and military life. Thus, a lifelong military family background may be a valuable complement to the career interest score derived from the Strong Campbell Interest Inventory questionnaire.

B. PURPOSE

As budgets for all branches of the military decline in real terms, efficiently using scarce resources becomes more critical. Minimizing attrition from the Naval Academy will save money by directing training funds toward future officers who will graduate and serve in the Fleet. The Navy receives no value from the training time and money invested in midshipmen who separate from the Naval Academy. Thus, refining the whole-man multiple to be a more effective tool to predict candidate performance at the Naval Academy can reduce attrition and save money.

This thesis will examine the success of midshipmen from military families at the Naval Academy and in the Fleet, relative to their peers from civilian families, in order to determine whether a military family background is associated with attrition from the Naval Academy and future performance in the Fleet. It is hypothesized that children from a military family are better aware of the requirements that the military makes upon its members and consequently they will exhibit lower attrition rates at the Academy and remain in the military longer than officers without a military family childhood.

C. SCOPE AND METHODOLOGY

1. Research Questions

This thesis will explore whether or not a midshipman's military family background is a determinant of graduation and subsequent performance in the Fleet. Data will be analyzed to determine if such a background significantly affects attrition and graduation rates. Order of merit at graduation will be investigated for differences between military and civilian family midshipmen. A midshipman's order of merit number is calculated by weighting the midshipman's academic performance, military conduct, physical education scores and military performance grades. As such, it encompasses a large portion of their performance at the Academy and provides a comprehensive view of each midshipman's performance. Finally, differences in fleet retention at the Lieutenant Commander promotion boards and promotion rates to Lieutenant Commander and Commander will be studied.

2. Scope

This thesis does not attempt to provide an alternative to the current Naval Academy's whole-man multiple for admission. Rather, it investigates further refinement of the whole-man multiple to ensure that highly qualified men and women, who are dedicated to a Naval career, are accepted to the Naval Academy.

Midshipmen in graduation year groups 1980 to 1985 and 1988 to 1992 are examined to determine their relative performance at the USNA and in the Fleet. Those midshipmen who elected commissioning in the Marine Corps were not included in the analysis. USNA performance is judged by reviewing voluntary and involuntary rates of attrition, graduation rates and orders of merit at graduation. Motivation for a military career was determined by

the officer's choice to remain on active duty to the Lieutenant Commander selection boards (approximately 10 years of commissioned service) or to leave the service. A comparison will be made between the percentages of officers from civilian and military families who remained on active duty to the Lieutenant Commander selection boards. Remaining in the service to the LCDR selection boards is important because it is indicative of careerist intentions on the part of the officer. Fleet performance is judged by achieving promotion to Lieutenant Commander and Commander. Again, the percentages of officers from military and civilian families who are advanced to the ranks of LCDR and CDR will be compared.

3. Methodology

A binary logit model will be used to analyze the determinants of the probability of graduation. The seven basic components that comprise the Naval Academy's whole-man multiple will be used as explanatory variables for the model. A second model will be constructed by adding an additional variable to the whole-man multiple model which represents the candidate's military family background.

In addition to studying the pre-admission characteristics of successful midshipmen, this thesis also examines pre-admission characteristics of those who fail to graduate. Attrition from the Naval Academy will be initially measured as a binary variable. A further review of attrition reviews specific reasons, such as academic, voluntary or conduct. A logit model assesses the effects of independent explanatory variables on the type of attrition. A review of midshipmen that have separated may show that certain background characteristics are associated with attrition from the Academy. It is hypothesized that midshipmen from military families will have lower rates of voluntary attrition due to their pre-existing familiarity with

the military.

To determine Naval Academy graduates' performance in the Fleet, their retention rates to the LCDR selection board and promotion results to LCDR and CDR are examined. The differences between careerist intentions (retention to the LCDR boards) and promotion performance between Naval Academy graduates with military family backgrounds are compared to academy graduates with civilian family backgrounds.

D. ORGANIZATION OF STUDY

This thesis is organized into five chapters. The next chapter discusses various studies that document developmental and social effects of children growing up in military families. It also compares attitudinal and value differences between military personnel and civilians. Finally, it discusses efforts by the Naval Academy to refine its whole-man multiple system in order to better identify applicants with the potential to succeed at the Academy and in the Fleet. Chapter III discusses military family lifestyles and reviews possible effects that a military family environment has on children and their interest in the military. It also discusses current social and developmental differences between military and civilian family children. Chapter IV explains the data used in this research, model development and discusses the statistical approach and findings. Finally, Chapter V presents conclusions about the efficacy of using military family backgrounds as a determinant of admissions in order to predict graduation from USNA and performance in the Fleet. Additionally, recommendations for further research are provided.

II. LITERATURE REVIEW

This chapter explains the purpose behind recent revisions to the Naval Academy's whole-man multiple system and reviews literature that supports the notion that value differences exist between military and civilian personnel. It is hypothesized that these value differences account for significant performance differences between Naval Academy midshipmen with career military family backgrounds and midshipmen with civilian family backgrounds.

This chapter is divided into six sections. The first three sections discuss the Academy's whole-man multiple system and differences between high school graduates that enlist in the military and those who do not. In addition, service academy students are compared to civilian university students in terms of values and other personal traits. The final three sections present studies of differences between active duty personnel and civilians, intergenerational linkage in active duty families and, finally, a summary of the implications for midshipmen from military and civilian families.

Section A discusses recent revisions to the whole-man multiple and its use in determining the relative quality of each candidate for admission. The whole-man multiple is an aid to the admissions board and is revised annually to ensure it is accurately predicting graduation. Section B presents evidence that differences exist between high school age seniors who enlist in the military and seniors who do not. These studies support the notion that interest in the military is formed at a relatively early age. Section C provides evidence that freshmen academy students also differ markedly in values from freshmen at civilian

universities. In addition, these studies suggest that the four-year academy experience tends to increase the value difference between academy students and university students.

The views of active duty military personnel have also been compared to civilian personnel in similar management positions. Section D presents evidence from military officer surveys that show distinct differences between their values and those of civilians at similar career points. These surveys suggest that value differences between military personnel and civilians are not dependent upon a military member's time in the service, but actually develop prior to entry into the military. Section E discusses the effects of intergenerational linkage between military parents and their children. The prevailing literature on child development suggests that parental attitudes and viewpoints have great influence upon their children. Therefore, career military parents may have more persuasive influence on their children joining the military than civilian parents. In addition, this section reviews the percentages of active duty military personnel with military family backgrounds. Finally, a summary of this chapter's findings and possible implications for selecting candidates for admission to the United States Naval Academy are discussed.

A. WHOLE-MAN MULTIPLE REVISIONS

The whole-man multiple was first introduced in the 1958 by Superintendent Melson as a method for better selecting candidates for admission.⁴ The whole-man multiple includes factors such as extracurricular activities, career and technical interests and teacher recommendations in addition to academic ability. It is an aid in selecting candidates for

⁴ Sweetman, J. The U.S. Naval Academy: An Illustrated History. Annapolis, MD., Naval Institute Press, 1979.

admission and is revised annually to continually select midshipmen with the highest potential to graduate and remain in the naval service.

In 1976, a 131-year-old tradition was broken when the first class of females entered the United States Naval Academy. That same year, the Naval Academy tasked the Navy Personnel Research and Development Center (NPRDC) to determine the effectiveness of the whole-man multiple in predicting the success rate of women at the Academy.⁵ The sample group for NPRDC's study consisted of the classes of 1980 through 1983 (males and females who entered the academy between 1976 and 1979). During this period, the female attrition rate was approximately 30 percent after four years, twice the rate for males.⁶ The study by NPRDC concluded that:

- The existing method for predicting plebe-year academic and military performance at the USNA was *effective* for female midshipmen.
- The existing method for predicting plebe year voluntary and involuntary separation was *ineffective* for female midshipmen.

In its study, NPRDC developed two experimental "separation scales" to model voluntary resignation data. Although these two models more effectively predicted voluntary resignation of females during their first year, they were negatively correlated with academic and military performance. Based upon its findings, NPRDC recommended that the USNA admissions system maintain its current selection criteria for women until more valid measures

⁵ Neumann, I., and Abrahams, N. M. Validation of Naval Academy Selection Procedures for Female Midshipmen. (NPRDC Tech. Rep.82-54). San Diego: Navy Personnel Research and Development Center, July 1982. (AD-A118484)

⁶ *Ibid.*

were identified. They also recommended repeating the validation procedure using four-year criteria, instead of one-year criteria, after a much larger contingent of female midshipmen had graduated.

In addition to this large scale study, NPRDC validates the whole-man multiple yearly based upon statistics from the graduating class in order to ensure it is accurately predicting midshipmen performance. This thesis proposes a refinement to this model that may be used for predicting success at the Naval Academy and in the Fleet.

The importance of a well-refined admission system was emphasized in a recent report issued by the Special Committee to the Board of Visitors at the United States Naval Academy. The 20-member Special Committee, co-chaired by retired Admiral Stansfield Turner and Goucher College President Dr. Judy Jolley Mohraz, was formed to assess the performance of the U.S. Naval Academy (USNA) following a series of highly publicized incidents that since 1989 have brought "unfavorable attention to the institution."⁷

One of the three broad strategies recommended by the Special Committee to improve the Naval Academy was "... to continue to seek improvements by, for example, refining the recruitment and admissions process ..."⁸ This thesis researches a possible refinement to the Naval Academy's admission system by examining the effect of a midshipman's military family background on performance at the Naval Academy and in the Fleet. However, "... as fewer Americans have firsthand experience with the military, the gap between public perception and

⁷ Burgess, R. R., "The Higher Standard." Sea Power Washington, 1997. vol. 40, no. 8, pp. 44-46, ISSN: 01991337.

⁸ *Ibid.*

the reality of military life (will continue to widen).”⁹ Thus, without a well refined selection system, the Naval Academy may experience higher attrition rates among midshipmen from civilian families due to this same perception gap about the military.

B. EDUCATIONAL AND ATTITUDINAL DIFFERENCES BETWEEN MILITARY RECRUITS AND CIVILIANS

1. Education Differences

Fredland and Little explored differences between military and civilian males, ages 18 to 22.¹⁰ Their data consisted of a nationwide stratified sample, the National Longitudinal Survey, Youth Cohort, 1979, and were collected in personal interviews. Approximately 2,170 items of information exist for each of the 6,398 men whose ages are 14 to 22. Their research focused on determining the educational levels, aspirations and expectation differences between military men and civilian men. The first analysis was a simple means test of the education level of military and civilian males of similar ages. However, this straightforward comparison may be misleading because the military recruits men directly out of high school. The study truncated the top age at 22, and therefore more civilian men have the opportunity to complete higher education than military men who enlist directly from high school.¹¹ Table I summarizes their results of mean education levels.

⁹ Peters, K. “Selling the Services.” Government Executive Washington, vol. 28, no. 8, Aug 1996, p. 32, ISSN:00172626.

¹⁰ Fredland, J. E. and Little, R. “Educational Levels, Aspirations and Expectations of Military and Civilian Males, Ages 18 - 22.” Armed Forces and Society, vol. 10, no. 2, 1984, p. 211.

¹¹ *Ibid.*

Table I. Educational Comparison Between Military and Civilian Males Age 18 - 22.

Military		Nonmilitary		
Whites	all	all	not in school full time	working
all ages	11.63	12.00***	11.89*	11.97***
all ages, 12 years or less of school	11.53	11.34***	11.32***	11.42***
Blacks				
all ages	11.88	11.32***	11.26***	11.38***
all ages, 12 years or less of school	11.76	10.88***	10.89***	11.02***
Hispanics				
all ages	11.50	10.84***	10.63***	10.62***
all ages, 12 years or less of school	11.35	10.19***	10.08***	10.00***

Note: Table adapted from Armed Forces and Society, vol., 13, no. 2, 1984, p. 213.

*** - significant at the 0.01 level

* - significant at the 0.05 level

Table I shows that white servicemen average fewer years of education than their civilian counterparts except when controlling for undergraduate work. Obviously, if men under the age of 22 are examined, the military group cannot have completed as many years of education as civilians who went directly to college. However, because of the truncation problem of the 22-year-old age group, the educational differences between military and civilian white males must be examined further.

Another factor of educational differences between military and civilian students is the percentage who have completed high school. Table II shows that all ethnic groups in the

military have comparatively higher high school diploma rates than civilian peers.¹²

Table II. High School Diploma Rates of Military and Civilian Males Age 18 - 22.

Military		Nonmilitary		
Whites	all	all	not in school full time	working
Diploma / Equivalent	85.1	74.5***	73.0***	75.9***
Blacks				
Diploma / Equivalent	92.5	52.6***	53.4***	58.7***
Hispanics				
Diploma / Equivalent	80.9	48.7***	46.4***	48.5***

Note: Table adapted from *Armed Forces and Society*, vol. 13, no. 2, 1984, p. 213.

*** significant at the 0.01 level.

In summary, the armed forces attract white men of somewhat lower educational quality than the population of 18 - 22-year-olds. However, the white military group possesses more members with high school diplomas than the civilian population. Further, white servicemen average more education than the civilian population when controlling for undergraduate education.

The difference of blacks and Hispanics in the military and civilian society is much more noteworthy. Blacks in the military average significantly more education than their

¹² *Ibid.*

nonmilitary counterparts, and this difference is greater when controlling for undergraduate education of civilians. For Hispanics, the differences in means are even more pronounced. Hispanic servicemen average over one-year more education than their civilian counterparts.

In the areas of aspirations and expectations, all ethnic groups in the military in this study desire, on average, significantly more years of schooling than their civilian counterparts and expect to complete more years of schooling.

2. Attitudinal Differences

Bachman, Sigelman and Diamond studied the attitudes of high school seniors using the database from the Monitoring the Future project. Not surprisingly, Bachman, et.al., found that seniors who plan to enter the military are more supportive of the armed forces than those who do not plan to serve.¹³ This prevalence of positive attitudes about the military is supported by earlier research that measured the “ideology gap” between military personnel and civilians.¹⁴ For example, data collected from nationally representative samples of sailors and civilians in 1972 and from soldiers in 1974 showed that military personnel had more positive attitudes concerning the military than their civilian counterparts.¹⁵

These studies support the proposition that attitudes and values favoring the military are not direct results of socialization within the military. Obviously, these seniors had no prior military experience from which to form their attitudes. Further, positive attitudes about

¹³ Bachman, J.G., Sigelman, L., and Diamond, G. “Self-Selection, Socialization, and Distinctive Military Values: Attitudes of High School Seniors.” Armed Forces and Society, vol. 13, no. 2, 1987, p. 169.

¹⁴ *Ibid.*

¹⁵ *Ibid.*

the military do not increase as the time in service increases.¹⁶ Most studies support "self selection," the theory that military-style values are formed before entering the service and that the military encourages and reinforces these values.

C. CHARACTER TRAITS OF MILITARY ACADEMY CADETS

Military ideology has maintained a disapproval of the lack of order and respect for authority which it feels characterized civilian society . . . In the past most professional soldiers even felt that the moral fiber of American manpower was 'degenerating' and might not be able to withstand the rigors of battle.¹⁷

1. Domestic Military Academy Studies

Ricks reports that a variety of informal and formal surveys have found that military academy students are collectively becoming more conservative politically and more assertive of their political affiliation.¹⁸ For example, Naval Academy midshipmen in 1974 were similar in their politics to their peers at civilian universities. Currently, midshipmen are twice as likely as other students to consider themselves conservative.¹⁹ These results have been found at the Military Academy also. In the early 1990's, former Army Major Isaacoff routinely surveyed her students on their politics, assessing approximately sixty cadets per semester. In a typical section of students, she found that about 17 cadets would identify themselves as

¹⁶ *Ibid.*

¹⁷ Janowitz, M. The Professional Soldier: A Social and Political Portrait. Glencoe, IL, The Free Press, 1960.

¹⁸ Ricks, T.E. "The Widening Gap between the Military and Society." The Atlantic Monthly, July 1997, pp. 66 -78.

¹⁹ *Ibid.*

conservative, while none would identify themselves as Democratic or Independent.²⁰ Other studies of service academy graduates have concentrated on individual values and their role in determining officer potential. For example, Bachman, Blair, and Segal have argued for the importance of value diversity, as well as socio-demographic diversity, in determining the degree to which military forces are reflective of their host societies.²¹ Their analysis showed that military personnel who are not career-oriented are very similar in many of their attitudes and values to their civilian counterparts. The study also showed that career-oriented military personnel differ markedly from civilians and from non-career-oriented personnel on issues such as the importance of military supremacy, willingness to use force as an instrument of international relations, and the influence of the military in American policy. It is hypothesized that military families instill these same values in their children.

Stevens, Rosa and Gardner conducted an analysis of 100 Coast Guard Academy cadets to determine the effect of the Academy on the values of the cadets.²² Their research used the Survey of Personal Values (SPV) and the Survey of Interpersonal Values (SIV). These two instruments present a total of sixty forced-choice questions that cover six scale areas each. The six scale areas addressed by the SPV are: 1.) Practical Mindedness, 2.) Achievement, 3.) Variety, 4.) Decisiveness, 5.) Orderliness, and 6.) Goal Orientation. The six scales of the SIV are: 1.) Support, 2.) Conformity, 3.) Recognition, 4.) Independence, 5.)

²⁰ *Ibid.*

²¹ Bachman, J., Blair, J., Segal, D. The All-Volunteer Force: A Study of Ideology in the Military. Ann Arbor, University of Michigan Press, 1977.

²² Stevens, G., Rosa, F., and Gardner, S., "Military Academies as Instruments of Value Change." Armed Forces and Society, vol. 20, no. 3, 1994, pp. 473-484.

Benevolence, and 6.) Leadership. These two tests were administered to the cadets during the first two weeks of their summer orientation and again after four years at the Coast Guard Academy. The results showed that eight of the twelve scales had significant changes from freshman year to senior year for the male Coast Guard cadets. These changes are shown below.

Table III. Personal and Interpersonal Values Scales of Coast Guard Cadets.

	Freshman		Senior	
	mean	s.d.	mean	s.d.
Personal values				
practical mindedness	12.86	4.78	14.82	5.43
variety	12.40	7.13	15.92	7.53
goal orientation	18.01	5.57	14.31	5.54
Interpersonal values				
conformity	16.55	5.49	11.46	5.66
recognition	10.32	5.34	12.18	5.55
independence	13.75	7.20	16.71	7.12
benevolence	16.47	6.44	14.52	6.30
leadership	18.14	6.41	20.15	5.97

Note: Table Adapted from Armed Forces and Society, vol. 20, no. 3, 1994, p. 473.

Although the cadets had statistically significant value changes over their four years at the Coast Guard Academy, these changes may not be solely attributed to the Academy's socialization process. For example, similar changes have been noted in the strength of values, attitudes and behavior of students at civilian universities.²³ In value studies of 200,000

²³ Astin, A.A. Four Critical Years. San Francisco, CA., Jossey-Bass, 1977; Kazem, M. "Development of University Student's Values in Ten Years: A Follow Up Study." ERIC Document Reproduction Service no. ED 263 805, 1986.

college students, Astin noted that "normal" college experience, environment and maturation all have an interactive effect on value changes.²⁴

Gordon used a similar study to report mean value scores for civilian colleges.²⁵ Upon comparing the initial values of the Coast Guard cadets, as found by Stevens, et. al., with Gordon's civilian college freshmen, evidence exists to support a theory of self-selection of applicants that chose to enter the Coast Guard Academy. Analysis of the SPV and SIV scales indicated that the entering male cadets were most notably different from male college students in "interpersonal values" and most similar in "personal values."²⁶

Further evidence that self-selection is a factor in the decision to attend a military academy comes from an institutional assessment of "culture and climate" at the Coast Guard Academy.²⁷ As a part of this study, the administrative and teaching staff, as well as the cadets, rated 15 values indicating the degree to which they should be encouraged and observed by all academy personnel. There was little difference in the ratings between the staff and students.²⁸

2. International Military Academy Studies

Hoppe conducted a study of international military culture and its contrasts with

²⁴ Astin, A.A.

²⁵ Gordon, L.V. "Survey of Interpersonal Values: Revised Manual." Palo Alto, CA, Science Research Associates, Inc., 1984.

²⁶ Stevens, G., Rosa, F., and Gardner, S., "Military Academies as Instruments of Value Change." Armed Forces and Society, vol. 20, no. 3, 1994, pp. 473-484.

²⁷ Coast Guard Academy. "Culture and Climate Assessment of the U.S. Coast Guard Academy." Prepared under contract with Princeton Economic Research, Inc., Princeton, NJ, 1992.

²⁸ *Ibid.*

civilian culture using a total of 664 military academy respondents from the Netherlands, Belgium, Germany, United Kingdom, Denmark, Norway, France, Italy, Spain, United States, Canada, Hungary and Belarus.²⁹ To operationalize the concept of culture, Hoppe used the Values Survey Module that was originally developed by Hofstede in his research on IBM subsidiaries in more than fifty countries.³⁰ For each military academy a score was obtained on each of four cultural dimensions: (1) the degree of perceived power distance; (2) the degree of uncertainty avoidance; (3) the degree of individualism; and (4) the degree of masculinity/toughness. Each of the four categories is briefly explained below and then a summation of Hoppe's results is presented.

The degree of power distance may be interpreted as the subjective counterpart of the centralization/decentralization dimension, and was measured by the responses to three items: (1) the percentage of student officers indicating that they have an authoritarian or paternalistic superior; (2) the opinion of the student officers about desirable styles of supervision; and (3) the number of instances in which subordinates do not dare to express their disagreement with superiors.

The degree of uncertainty avoidance indicates the formalization or rule orientation in the organization and was measured by responses to three questions: (1) Should the organization's rules be broken if the employee thinks it is in the best interest of the

²⁹ Hoppe, M. "A Comparative Study of Country Elites: International Differences in Work-related Values and Learning and Their Implications for Management Training and Development." Ph.D. diss., University of North Carolina at Chapel Hill, 1990.

³⁰ Hofstede, G.H. Culture's Consequences: International Differences in Work-related Values. Beverly Hills, CA., Sage Publications, 1980.

organization? (2) Do the individuals expect to work another five years for the organization? (3) What is their level of perceived stress at work? In academies where perceived stress is high, it is hypothesized that members will tend to avoid uncertainty-generating situations.

The individualism index is based on responses to four questions that deal with physical working conditions, personal relations, sufficiency of leisure time, and quality of the living environment. If importance is attached to good physical working conditions and good personal relations, a collective orientation is indicated. If, on the other hand, relatively more importance is attached to leisure time and a pleasant living environment, this is taken to reflect an individual orientation. The masculinity index reflects the Western achievement orientation. Respondents who value income and promotion opportunities more than job security and good personal relations score highly on this index.

In evaluating the scores for the four cultural dimensions, Hoppe's results showed clear differences between the student officers and the IBM subject in all areas except uncertainty avoidance. For example, the student officers expressed a much higher degree of power distance as compared to the IBM subjects previously studied by Hofstede. The student officers more often perceived superiors as behaving in an autocratic or paternalistic way and more frequently perceived that subordinates were afraid to express disagreement with their superiors. Finally, fewer student officers preferred the superior to act in a consultative style.

The individualism culture measure showed a clear distinction between the academies and civilian society. Nine of the eleven military academies had scores that were slightly lower to much lower than the IBM sample. This means that the cultures in military academies, and presumably in the armed forces as a whole, are more collectivistic when compared to the

civilian business sector. Concretely, this result suggests that student officers value time for personal and family life and a pleasant living environment relatively less than having good physical working conditions and good working relations. This clearly demonstrates that the personnel in the armed forces show a more institutional attitude when compared to personnel in the business sector, which has a more occupational orientation. Despite recent shifts toward the occupational orientation that may have occurred,³¹ student officers are apparently still dedicated to their organization and have fewer problems in making sacrifices for their jobs, such as foregoing leisure time and accepting mobility, than are civilians.

On the masculinity score, the student officers from all academies were lower than civilians in the IBM study. This means that, in comparison to IBM employees, student officers value income and promotion opportunities less than job security and good personal relations. This result agrees with the individualism index and provides another indication that military personnel, at least the student officers, have a working attitude that is far more institutional than that found among employees working in civilian companies.

Finally, Hoppe's results were mixed with regards to the dimension of uncertainty avoidance. Six academies, including West Point, showed higher scores than the IBM sample. This higher degree of uncertainty avoidance implies more rule orientation, more stress, and more people who intend to stay in the military for longer periods of time. Hoppe's research showed that the values of student officers and the IBM sample varied significantly in three of the four variables he used to define culture. If these results can be applied to the military and

³¹ Stahl, M.J., McNichols, C.W., and Manley, R.T. "A Longitudinal Test of the Moskos Institution-Occupation Model: A Three-Year Increase in Occupational Scores." Journal of Political and Military Sociology, vol. 9, no. 1, 1981, p. 43.

civilian population in general, it might support the hypothesis that the two populations significantly differ in values and culture.

In addition to Hoppe's study, the two previous studies on academy students garner more support for the theory that the military and society differ in viewpoints and values. To the extent that these results can be generalized to the armed forces as a whole, the military and society may show similar differences in culture and values.

D. MILITARY AND CIVILIAN CULTURAL DIFFERENCES

The indications that real differences exist between military and civilian culture is not a recent idea. In fact, the notion that the military has a distinct set of values has long been accepted.³² Most research now tends to focus on why the connection exists between military service and military values.³³ Two dominant theories that try to explain the connection are "socialization" and "self-selection." The socialization theory supports an idea that the military teaches certain types of attitudes and orientations, both formally and informally.³⁴ The alternative theory for promotion of military values focuses on self-selection, the tendency for certain types of people to enter the military and others to avoid it.³⁵

³² Huntington, S. P. The Soldier and the State. Cambridge, Harvard University Press, 1957, reprint, New York, Vintage Press, 1964.

³³ Bachman, J.G., Sigelman, L., and Diamond, G. "Self-Selection, Socialization, and Distinctive Military Values: Attitudes of High School Seniors." Armed Forces and Society, vol. 13, no. 2, 1987, p. 169.

³⁴ Dornbush, S. M. "The Military Academy as an Assimilating Institution." Social Forces, vol. 33, May 1955, pp. 316-321.

³⁵ Cockerham, W. C. "Self-Selection and Career Orientations Among Enlisted U.S. Army Paratroopers: A Research Note." Journal of Political and Military Sociology, vol. 6, no. 2, 1979, pp. 249-259.

1. Institutionalized Differences

Much of the "gap" that exists between the military and civilian society is intangible and not easily measured or identified as the analysis performed by Hoppe of 13 international military academies might indicate. For example, Thomas Ricks provides a picture of current military and civilian relations in his article entitled "The Widening Gap Between the Military and Society."³⁶ In 1995, he spent eleven weeks in Marine boot camp at Parris Island, South Carolina. After completion of boot camp, he followed several recruits back home and interviewed them about their adjustment period at home. His anecdotal evidence supports the theory that the Marine Corps is successful in changing the values and character of its military members. The Marine Corps purposefully attempts to institutionalize its values in all of the recruits. Its purpose is to build a comradery by establishing the Marines as "a cut above" society.

A common theme in all of his interviews with the Marines of platoon 3086 was their perceived incompatibility with their previous life and friends. The majority of the Marines felt they did not understand the motivation and values of their friends after they had completed boot camp.

2. Environmental Factors

Several changes are under way both in the military and in society that threaten to widen the existing gap between the two.³⁷ As far as the military is concerned, the transition to the All-Volunteer Force (AVF) in 1973 and the post-draft professionalization of the

³⁶ Ricks, T.E.

³⁷ *Ibid.*

services are the most prominent events in forming current military culture. The self-selection process, discussed earlier by Bachman, has had the effect of increasing the political conservatism and activism of the military.³⁸

In addition to the AVF, the continual base closings and privatization of many DoD support activities are effectively isolating the military as well. For example, the base closure commissions are essentially concentrating the military to bases in the South and West.³⁹ Further, the move to privatize many functions of the support structure is decreasing the number of military personnel in civilian type occupations. In addition, this privatization is moving many functions that were primarily handled by military servicemen to off-base civilian industries. Consequently, military personnel might be more likely to work in occupations that have no civilian equivalent and are not well understood by the civilian business sector.⁴⁰

3. Attitudes

Conservative attitudes are prevalent among officers as well as at the military academies. A 1995 survey of Marine officers at Quantico, Va. found conservative and Republican party affiliation views similar to those of service academy cadets.⁴¹ Fully 50 percent of the new marine officers at The Basic School in Quantico identified themselves as conservatives along with 69 percent of mid-career officers at the Marine Corps Command and Staff College. Most notable is the fact that 80 percent of the new lieutenants and 64 percent

³⁸ *Ibid.*

³⁹ *Ibid.*

⁴⁰ *Ibid.*

⁴¹ *Ibid.*

of the mid-level career officers agree that the military's values are closer to those of the Founding Fathers than are the values of civilian society.⁴²

While the Marine Corps is arguably the most extreme example of the difference between military and civilian values, the other services tend to follow the Marines' lead in terms of values and ideals. Consequently, the attitudes of the Marine Corps can be expected to move to the rest of the military. Andrew Bacevich, executive director of the Foreign Policy Institute at John Hopkins University School of Advanced International Studies, believes "There is a deep-seated suspicion in the U.S. military of society."⁴³ More important, he believes that this suspicion "... is not going away, but is being transmitted ... " to the new generation of officers.⁴⁴

These cultural differences may account for a military family student's stronger desire to graduate from a service academy, other things equal, than students from civilian families. Academy students from military families may feel a sense of "fit" in the military system and therefore strive harder to remain in the program. Finally, their familiarity with the military may provide them a better understanding of the many requirements within the military and academy system.

E. INTERGENERATIONAL LINKAGE OF MILITARY FAMILIES

It is widely accepted that parents play a salient role in the career development of their

⁴² *Ibid.*

⁴³ *Ibid.*

⁴⁴ *Ibid.*

children and may have the greatest potential for assisting their children in career planning.⁴⁵ For example, Kotrlik and Harrison conducted a study of high school seniors in Louisiana in which they found that parents were perceived as most influential in the senior's career choice.⁴⁶ This influence was greater than persons working in the desired occupation, teachers, counselors, friends and siblings. In other words, the seniors were more influenced by their parents' advice, even when faced with people who ostensibly had more credibility and experience with their intended career choice.

The officer corps in the military exhibits greater intergenerational linkage than most civilian occupations.⁴⁷ However, a few studies have tested this hypothesis with enlisted personnel. Biderman and Haley studied enlisted personnel and found that sons of career military fathers chose military careers at three to four times the rate of their peers.⁴⁸

In a further study of intergenerational linkage, Faris analyzed recruitment from military families in the All-Volunteer Force with a sample of 152 offspring of career military personnel. He estimated that these career juniors intend to complete a military career 1.7 times more frequently than their enlisted peers with nonmilitary backgrounds. He also examined military service of male high school graduates in 1972 using data obtained from the

⁴⁵ Otto, L.B., and Call, V.R.A. "Parental Influence on Young People's Career Development." Journal of Career Development, vol. 12, 1985, pp. 65-69.

⁴⁶ Kotrlik, J.G., and Harrison, B.C. "Career Decisions Patterns of High School Seniors in Louisiana." Journal of Vocational Education, vol. 14, 1989, pp. 47-65.

⁴⁷ Lang, K. Military Institutions and the Sociology of War: A Review of the Literature with Annotated Bibliography. Beverly Hills, CA., Sage Publications, 1972.

⁴⁸ Biderman, A.D. and Haley, B.A. "An Exploratory Study of Intergenerational Occupational Succession in the Navy." Washington, D.C., Bureau of Social Science Research, 1979.

National Longitudinal Survey. Although the draft was still in effect at this time, Faris included only volunteers in his study and focused his attention on the sons of career military fathers. Table IV provides an overview of military service among recruits whose fathers were military and non-military.

Table IV. Military Service of Male High School Graduates by Father's Occupation.

Military Service as of 1976	Father's Occupation	
	Military %	Non-military %
did not serve	78.3	89.6
n	(119)	(8508)
served on active duty	21.7	10.4
n	(33)	(983)

Note: Table adapted from Armed Forces and Society, vol. 7, no. 4, 1981, p. 545.

Table IV shows that the rate of military service for the class of 1972 was twice as high (21.7 vs. 10.4) for sons of career military personnel as for sons of civilian fathers. Although the total percentage of military sons forms a small percentage of the total force (33 of 1016, or 3.2 percent) the NLS did not include fathers who had retired from the military by the time of the study.⁴⁹ Consequently, the number of career military sons might be somewhat higher than reported.

In another study of the intergenerational military linkages, Thomas examined data from the 1978 DoD Survey of Officers and Enlisted Personnel and divided the respondents

⁴⁹ Faris, J.H. "The All-Volunteer Force: Recruitment from Military Families." Armed Forces and Society, vol. 7, no. 4, 1981, p. 545.

into three general categories.⁵⁰

- non-juniors: military personnel whose parents had no military experience;
- other juniors: military personnel whose parents had less than 10 years of military experience;
- career juniors: military personnel with either mother or father having 10 years or more of experience.

Table V describes the overall prevalence of juniors in the military in 1979.

Table V. Prevalence of Military Juniors.
(In Percentages)

	Enlisted	Officer	DoD
non-juniors	42.9	41.7	42.7
other Juniors	45.1	42.4	44.8
career Juniors	12.0	15.9	12.5
n	16,438	9,511	25,949

Note: Table adapted from Armed Forces and Society, vol. 10, no. 2, 1984, p. 296.

It is evident from Table V that military personnel whose parents had some military experience comprise a majority of enlistments in the armed forces. When military juniors are separated into first term and second term enlistments, the influence of the military family background becomes more apparent. Table VI regroups the data into recruits with military family backgrounds (juniors) and recruits without any military family background and presents

⁵⁰ Thomas, G.W. "Military Parental Effects and Career Orientation Under the AVF: Enlisted Personnel." Armed Forces and Society, vol. 10, no. 2, 1984, pp. 293 - 310.

the data by branch of service.

Table VI. Military Juniors by Branch of Service.
(In Percentages)

	Army	Navy	Marines	Air Force
First Term				
non-juniors	40.1	30.9	38.7	30.0
juniors	59.9	69.1	60.2	70.0
n	884	1,759	1,262	1,174
Second Term				
non-juniors	43.8	40.3	41.6	35.5
juniors	56.3	59.7	58.4	64.4
n	418	263	300	191

Note: (1) Table adapted from *Armed Forces and Society*, vol. 10, no. 2, 1984, p. 296.

(2) Percentages may not add to 100 due to rounding.

It is evident that recruits from families with military experience comprise a large portion of the overall enlistment in each branch of the armed forces regardless of enlistment term. Finally, the prevalence of enlisted juniors in the military as of 1979 suggests a strong intergenerational linkage. Of all active duty personnel, 58.3 percent had parents who had some military experience and 12.5 percent had parents with more than 10 years of experience in the military. The career juniors were more prevalent in the officer corps, 15.9 percent, as compared to enlisted ranks, 12.0 percent.

Faris' and Thomas' research support the hypothesis that intergenerational linkages exist in the military. Although critics may contend that the large percentage of military juniors in the armed forces is due to pressure and authoritative influence from the parents,

data exists to contradict this theory. For example, in the 1972 National Longitudinal Study sample of high school graduates, only one-quarter of the sons of career military fathers reported receiving unqualified support from their parents to enter the military.⁵¹ A similar percentage were somewhat discouraged from entering the military. According to the same study, a majority of the sons of career military fathers (78 percent) received encouragement to attend college rather than join the military; this rate was higher than that of other male high school graduates (68 percent).

F. SUMMARY

This thesis examines the effects of a military family background on performance at the Naval Academy and in the Fleet. Much research has shown that the military and civilian society differ in terms of values, ideals and culture. In fact, the values of freshmen entering a service academy have been shown to be statistically different from those of freshmen at civilian universities. It appears that the academies tend to further develop and encourage the values that are already present in its cadets. Further, evidence has shown that parents have a great deal of influence in forming their children's values and character. Therefore, military children may be more prone to enter the military because of parental influence. In addition, military children might remain in the service longer because they are more informed about military service than children from civilian families and therefore might be a better "fit" within the military system.

This paper examines the hypothesis that a military family background offers

⁵¹ Faris, J.H.

measurable advantages to children who enter the service academies and later serve in the armed forces. Midshipmen from military families are compared to midshipmen from civilian family backgrounds in terms of performance at the Naval Academy and in the Fleet. The underlying hypothesis is that a self selection process exists so that children who benefit from their military childhood will have an interest in the armed forces and, more particularly, the services academies. Further, this paper examines the relative performance of military children at the Naval Academy and retention and promotion rates in the Fleet to determine if their military background has provided them with an advantage over their classmates.

III. MILITARY FAMILIES

Belonging to a military family places many special burdens on both the service member and the family. These special burdens may cause military family children to develop differently than civilian family children. In order to appreciate the differences between military families and civilian families, it is necessary to understand military culture, the nature of military deployments and their combined effect upon military children. This chapter familiarizes the reader with main aspects of each of these items.

A. MILITARY CULTURE

Military families have undergone many changes in the last 30 years. As the families of conscripted servicemen have disappeared from the ranks due to the All-Volunteer Force, today's military member is a willing volunteer. This willingness to serve is changing the demographics of the force to one which is more senior and career oriented. Presently, the armed forces consist of 50 percent career personnel which is double the rate of career personnel during the draft-era.⁵² Consequently, more military families and military children exist today than previously. More important, children in military families experience different developmental processes compared to their civilian counterparts due to frequent moves, residence in foreign cultures, and transient parental absences due to military deployments and exercises.⁵³

⁵² Armor, D.J. "Military Sociology." The Encyclopedia of Sociology, E.F. Borgatta and M.L. Borgatta, eds., March 1991.

⁵³ Hunter, Edna J., Families Under The Flag. A Review of Military Family Literature. Praeger Publishers, New York, 1982.

A military lifestyle, where changes in duty station can be expected every three to five years, places mobility requirements upon the family that are not usually encountered in civilian families. For example, toward the end of the Cold War, approximately nine percent of enlisted soldiers and 31 percent of officers with more than 14 years of service had reported moving with their spouses or children more than nine times.⁵⁴ In a study of military family children conducted by Ender, he reported that the highest stressor for military children was geographic mobility.⁵⁵ Moves also place financial burdens on the family. Military wives who were employed at their past duty station obviously lose time at work when the family is transferred. The requirements of moving the household entail both preparation for the move, transit time to the new duty station and readjustment into the new residence. In a study of military wives' earning potential, Payne, Warner and Little reported that military wives, on average, lose approximately ten months in the labor force due to their tied migration with their military spouse.⁵⁶ In addition to lost work time, the frequent moves also hamper military wives' ability to gain seniority in their current positions. Finally, job-specific skills usually are not fully transferable between employers.⁵⁷

Despite the many negative aspects of constantly changing duty stations, Carlson and Carlson, during their study of a VP squadron (an aircraft squadron composed of P-3 planes

⁵⁴ *Ibid.*

⁵⁵ Ender, Morten G. "A Sense of Place: Social Demands of Growing up Military, 1946 - 1990." Paper presented at the International Biennial Meetings of the Inter-University Seminar on Armed Forces and Society, Baltimore, Maryland, October 24-26, 1997.

⁵⁶ Payne, D.M., Warner, J.T., and Little, R.D. "Tied Migration and Returns to Human Capital: The Case of Military Wives." Social Science Quarterly, vol. 73, no. 2, June 1992.

⁵⁷ *Ibid.*

whose primary duty is to locate and track Russian submarines) in Maine, found that the mobility requirements of Navy life were enjoyed by the majority of people interviewed.⁵⁸ Willingness to move around is family dependent and the attitudes of parents are extremely important in determining how children will react to the move.⁵⁹ Instead of being a stressful time, many of the military families interviewed during the study stated that they enjoyed the chance to meet new people and visit different parts of the country. Pleasure derived from moving around is dependent upon each family and the attitudes of the parents are extremely important in determining how the children will react to the mobility. In comparison to civilian families that experience less frequent moves, approximately one-third of the personnel on any military base change every year.⁶⁰

Besides the frequent moves, military children may also experience different social circles than other civilian family children due to the "small community" nature of military housing. The study by Carlson and Carlson found that the Navy VP squadron was a tight community within the civilian community where they resided. For example, three-quarters of the interviewees stated that "most" or "all" of their close friends were also in the Navy. This tight socialization in the military may come from living in military housing areas. The military culture lends itself to a system where many military people occupy military housing and live in their own communities instead of residing in civilian communities. As shown in

⁵⁸ Carlson, Elwood and Ruth. Navy Marriages and Deployment. University Press of America, Lanham, Maryland, 1984.

⁵⁹ Hunter, Edna J.

⁶⁰ *Ibid.*

Carlson and Carlson's study of the VP community, this socialization with other military families tends to further instill the military lifestyle in children. Since the children grow up with more military children as friends, they begin to have more in common with each other than with children from civilian families.

As a further distinction between the military and civilian societies, 80 percent of the Navy men and women interviewed by Carlson and Carlson believed their civilian friends could not understand or appreciate the work the military members performed. This finding supports the notion that the military views itself as different from the civilian community. As previously mentioned in Kotrlik and Harrison's earlier study of parental influences on high school seniors,⁶¹ parental views of this type can shape their children's values at an early age and cause the children to see themselves differently from the rest of society due to their involvement with the military.

B. DEPLOYMENTS

In any family where one of the parents is absent for work-related or other reasons, the remaining family members necessarily assume more responsibilities in order to handle the increased workload. In families with older children, the remaining spouse ultimately delegates more responsibilities for maintaining the household to these children out of necessity. Although families with both parents present may also try to impose increased responsibility for their children, these actions do not have the same urgency as families with one parent absent. Military families, on average, experience these types of separations due to normal

⁶¹ Kotrlik, J.W., and Harrison, B.C. "Career Decisions Patterns of High School Seniors in Louisiana." Journal of Vocational Education, vol. 14, 1989, pp. 47-65.

military deployments and exercises.

1. Current Situation

Routine deployments of military members are common to all the services. Each of the services is responsible for tracking its own deployment rates through Operational Tempo (OPTEMPO) and Personnel Tempo (PERSTEMPO) reports. OPTEMPO is defined in terms of the unit as a whole, whereas PERSTEMPO is based upon the individual. This important distinction is illustrated when a soldier transfers from a unit that has recently completed a deployment to another unit that is preparing for immediate deployment. The high deployment pace for the individual would be reflected in his PERSTEMPO, even though the OPTEMPO for the two separate units was within standards. Tracking OPTEMPO is a complicated and difficult process because there is no DoD-wide definition of "deployment" and each of the three services defines it differently.⁶² Consequently, periodic absences of one military parent are common but it is difficult to accurately determine the exact frequency that military parents are away from home.

Despite the fact that most military deployments are scheduled, many times world events dictate that a larger number of personnel deploy than what was previously scheduled. However, measuring this increase in deployments is difficult because, until 1994, only the Navy had systems to track PERSTEMPO.⁶³ Despite this inability to accurately measure past PERSTEMPO rates, the DoD estimated that the percentage of personnel deployed between

⁶² United States General Accounting Office. "Military Readiness: A Clear Policy is Needed to Guide Management of Frequently Deployed Units." April 1996, NSIAD-96-105, GA 1.13.

⁶³ *Ibid.*

1987 and 1995 increased from about two percent to about six percent for the Air Force and from about five percent to nine percent for the Army.⁶⁴ In comparison, the Navy increased its deployment percentage from 11 to 14 percent and the Marine Corps increased slightly from 12 to 13 percent.⁶⁵ Because the Navy and Marine Corps routinely deploy on cyclical schedules, they have usually responded to crises overseas with units that are already deployed.

In 1992, the Army had 12,000 soldiers deployed to 38 countries while in 1993 that number increased to 25,000 soldiers deployed to 60 countries.⁶⁶ This increase in missions occurred while the draw-down of military manpower continued. Furthermore, the reduction in military personnel has decreased the number formerly stationed overseas. Consequently, fewer people are responding to more deployments and are traveling farther while doing so.

In addition to deployments, a large increase in the number of joint exercises emerged following the Gulf War. According to the Commanders-in-Chief of various Major Commands, these requirements have doubled for some units.⁶⁷ Although joint exercises typically do not last a considerable length of time, these additional requirements are increasing the time that military members spend away from home. Further compounding the problem, no DoD system tracks joint exercises, which makes it difficult to measure their impact on individuals.

⁶⁴ *Ibid.*

⁶⁵ *Ibid.*

⁶⁶ Riddle, Catherine. "On the Road Again: Families Cope with Faster Pace of Deployments." Army Times, vol. 53, July 26, 1993, pp. 12-14.

⁶⁷ United States General Accounting Office. "Military Readiness." 1996.

2. Effects of Deployments on the Family

The impact upon the family of high deployment rates is still being studied. However, it is certain that while the military member is away from home, the rest of the family assumes more responsibilities than previously. Consequently, military children may be more likely to experience increased responsibilities at an earlier age than civilian families with fewer parental absences.

Military-induced separations create stress due to the commotion accompanying departure of the military member, the increased care-taking and household responsibilities of the remaining spouse, disconnected relationships, loss of emotional support, and the readjustment of roles upon reunion.⁶⁸

Michelle Kelly conducted a study of military families in Norfolk, Virginia.⁶⁹ She studied 61 mothers of children between the age of five and 13 whose husbands completed a six- or seven-month deployment between 1989 and 1991. For the purposes of her study, she defined "young" children as 8 years old and younger, with the 9 to 13-year-old group as "older." Two-thirds of the sample completed their deployment prior to the Gulf War and the remaining third were deployed as the Gulf War started. This allowed an additional comparison between the stresses caused by routine deployments and those of wartime deployments. Her study supported earlier findings that separation appears especially disruptive for families of young children.

⁶⁸ Long, P. "Growing up Military." Psychology Today. vol. 20, no. 12, 1986, pp. 31-37.

⁶⁹ Kelley, M.L. "Effects of Military Induced Separation on Family Factors." American Journal of Orthopsychiatry. vol. 64, January 1994, pp. 103-11.

Kelley also found differences between the two types of deployments. Wartime deployments caused significantly more problems with child behavior and family cohesiveness. In both instances, child behavior was negatively affected prior to and at the beginning of the deployment. With peacetime deployments, the children's behavior problems subsided as the deployment progressed. However, the level of problems remained fairly constant for children during wartime deployments. Further, the families with peacetime deployments reported higher levels of family togetherness after the father's return than those from wartime deployments.

A GAO study on "Military Readiness" demonstrated that the frequency of deployments and long separations for military service members are increasing.⁷⁰ As the military draw-down continues, the pace of deployments for individuals will continue to heighten.

Aside from the emotional aspects of one parent deploying, a very different situation exists for single parents and dual military couples. The services do not exempt single parents from deployment requirements, nor do they waive one military parent of a dual military couple from deployment.⁷¹ During Desert Shield and Desert Storm, 16,337 single parents and 1,231 dual-military parents deployed to Southwest Asia.⁷² However, the presence of dual-military parents is a recent development and therefore most research on military families

⁷⁰ United States General Accounting Office. "Military Readiness." 1996.

⁷¹ Fuentes, Gidget. "Mended Families, Broken Bonds" Air Force Times, vol. 52, no. 28, February 17, 1992, pp. 45-47.

⁷² *Ibid.*

deals with only one parent who is a member of the armed forces. The effects on children who are separated from both parents have not been investigated fully.

Most studies of military families have concentrated on the negative effects of parental absences, geographic mobility, residence in foreign countries and socialization differences unique to the military culture. In fact, anecdotal evidence suggests that fighting, defiance, fear, depression, anxiety and school difficulties are common among children of military families whose fathers are absent.⁷³ However, there may also be positive factors associated with military family backgrounds as suggested by the high enlistment rates for military juniors that were shown in Chapter II.

3. Reunion

Although research on family reunions is sparse, the existing data show that reunions are often more stressful than the departure.⁷⁴ Throughout the separation, spouses have necessarily accustomed themselves to performing daily tasks without the other. After returning home, the husband, wife and children all adjust to their new roles in the family and interactions with each other.⁷⁵ Normally, the returning spouse feels insecure because the family has learned to function without him and he abruptly tries to reestablish himself in the household. Often, the remaining spouses are reluctant to release their newly-gained responsibilities and tensions increase.

⁷³Crumley, F.E. and Blumenthal, R.S. "Children's Reactions to Temporary Loss of the Father." American Journal of Psychiatry. vol. 130, 1973, pp. 778-782.

⁷⁴ Hunter, Edna J.

⁷⁵ *Ibid.*

C. CHILDREN

1. Educational Differences Between Military and Civilian Children

In 1990, there were two million active duty military personnel with approximately 1,625,000 children under the age of 21. Nearly one-fourth of these soldiers lived outside the United States.⁷⁶ School age children living in foreign countries attend Department of Defense Dependents' Schools (DoDDS). These schools allow the children to continue their normal education unhampered by difficulties associated with living in a foreign country.

In school year 1990-91 there were more than 130,000 students enrolled in DoDDS Schools.⁷⁷ In March of 1992, the DoDDS released a report gauging the progress of DoDDS schools in meeting the educational goals put forth by President Bush. In its report to the Advisory Council on Dependent's Education on January 24, 1992, the DoDDS reported that based upon standardized test scores for the year 1990-91, their students tested above the national average.⁷⁸ In addition, the DoDDS schools had a higher percentage of students taking more challenging courses and exams to earn college credit and gain admission to universities. For example, the percentage of DoDDS 1991 graduates taking advanced placement tests, 16.5 percent, was double the national average.⁷⁹ In 1995 the college

⁷⁶ Defense 90. American Forces Information Service, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 1992.

⁷⁷ *Ibid.*

⁷⁸ Nelson, Soraya S. "New DoD Schools Report Grades Past, Plans Future." Air Force Times, vol. 52, no. 31, March 9, 1992, p. 26.

⁷⁹ *Ibid.*

entrance examination scores of DoDDS students topped the national average by five points.⁸⁰ In addition, 62 percent of DoDDS students took the SAT in 1995 as compared to the national average of 41 percent.⁸¹

To analyze student performance in lower grade levels of DoDDS schools, fourth grade students in 81 elementary schools participated in the National Assessment of Educational Progress Reading Assessment for the first time in February 1994. These students scored six percentage points above the national average, with a reading score of 219 as compared to 213.⁸² Bartley Lagomarsino, deputy director of the Department of Defense Education Activity, attributed the results to "the system's (DoDDS) strong emphasis on reading, teachers who are well trained and parents who place a strong emphasis on reading at home."⁸³

It is difficult to gage similar academic performance of military children in the states because the data are not recorded. However, most educational professionals agree that parental involvement in the child's education is required for that child to excel. Based upon this requirement, the DoDDS report supports the proposition that military parents overseas are more involved in their children's education than parents in civilian families.

⁸⁰ Jowers, K. "SAT Scores Improve (for students in overseas Defense Department Schools)." Air Force Times, vol. 56, no 12, October 23, 1995, p. 26.

⁸¹ *Ibid.*

⁸² Jowers, K. "Kids Read above Average." Air Force Times, vol. 55, no. 42, May 22, 1995, p. 18.

⁸³ *Ibid.*

2. Environmental Differences Between Military and Civilian Children

a. *Geographic Mobility of Military Families*

Serving in the armed forces requires periodic personnel transfers from one duty station to another. Both the frequency of moves and the length of tours vary among the services according to organizational policy. The potential impact of frequent moves on children was studied using data from the 1978-79 DoD Survey of Officers and Enlisted Personnel. The study found that

(twenty-nine) percent of surveyed enlisted personnel have been at their present location less than one year, 36 percent between one and two years, and 21 percent between two and three years. Among officers, 33 percent have been at their present location less than one year, 33 percent between one year and two years, and 22 percent between two and three years.⁸⁴

Thus, almost 90 percent of enlisted personnel and officers had moved in the three years prior to the survey. Although many families view the opportunity for travel as a benefit of military service, frequent moves can be a hardship that disrupts family life and necessitates adjustments under the best of circumstances.⁸⁵

A study of the effects of frequent moves has shown large differences between children of different ages. For children up to six years of age, mobility may not be disruptive as long as the parents are supportive of the children's feelings and maintain a positive attitude themselves.⁸⁶ In adolescents, however, frequent moves may have adverse impacts on the

⁸⁴ Hunter, Edna J.

⁸⁵ Mckain, Jerry L. "Alienation: A Function of Geographic Mobility Among Families." in McGubbin, Dahl and Hunter, eds., Families in the Military System, 1976, pp. 69-91.

⁸⁶ Shaw J., Duffy, J., and Privitera, C. "The Military Child: A Developmental Perspective." in E. Hunter and D. Nice, eds., Children of Military Families: A Part and Yet Apart, Cat. no. 008-040-00181-

child such as becoming withdrawn or, conversely, more aggressive.⁸⁷ It becomes increasingly difficult for children of high school age to view moving favorably. Moving during high school years may cause stress as children are forced to leave old friends and make new ones in a different high school.

The instances of relocation and retirement have been pointed to as variables influencing child adjustment and development.⁸⁸ However, many studies of military children have shown that disruptive behaviors in children are reflective of the parents' attitudes toward the move rather than the move itself.⁸⁹ Families that are optimistic about the move have fewer incidences of disruptive behavior in their children. Again, the parents have a great deal of influence over their children's view of the military. Parents who enjoy the military lifestyle are more apt to have children that are interested in the military when they mature.

b. Foreign Residence

Living in a foreign country imposes many hardships on children in addition to the family as a whole. Ender examined the requirements of living overseas and their impact

4. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1978.

⁸⁷ Baggett, N. "Going Overseas: It's Not Just Another Move for Your Child." The Times Magazine, February 6, 1979, pp. 7 - 10.

⁸⁸ Dickerson, W., and Arthur, R. "Navy Families in Distress." Military Medicine, vol. 130, 1965, pp. 894-898. Giffen, M., and McNeil, J. "Effect of Military Retirement on Dependents." Archives of General Psychiatry, vol. 17, 1967, pp. 717-722. Kurlander, L., Leukel, D., Palevsky, L. and Kohn, F. "Migration: Some Psychological Effects on Children, A Pilot Study." American Orthopsychiatric Association Annual Meeting, New York, March 1961.

⁸⁹ *Ibid.*

on children.⁹⁰ In his research, he found that many high school graduates postpone returning to the U.S. until their parents do.⁹¹ In his study he found that military children who stayed overseas until their parents returned felt stress due to "lack of part time jobs," "not identifying with American culture," and "returning to USA for college and being out of step." Further, many respondents identified stress due to the fear of terrorism and anti-Americanism. For example, the response "being in a country devastated by war (post-WWII Germany) and being blamed for the devastation" was representative of the origins of this fear.⁹² Finally, when asked "What place they felt most attached to?", about 20 percent of the respondents reported specific sites outside of the U.S., even though the majority of the respondents resided in the U.S. at the time of the survey.⁹³ Apparently, living outside the U.S. had a positive impact upon these 20 percent of the respondents.

c. Stress Levels

Stress in military children manifests itself in different ways. In terms of medical costs for mental health, military family members aged 10 - 19 accounted for nearly 60 percent of all mental health claims made to the Civilian Health and Medical Program for the Uniformed Services (CHAMPUS).⁹⁴ In one Pentagon study of depression among

⁹⁰Ender, Morten G. "A Sense of Place: Social Demands of Growing up Military, 1946 - 1990." Paper presented at the International Biennial Meetings of the Inter-University Seminar on Armed Forces and Society, Baltimore, Maryland, October 24-26, 1997.

⁹¹ Tyler, Mary P. "The Teenager in Europe." United States Army Medical Research Unit-Europe, HQ, 7th Medical Command, 1987.

⁹² Ender, Morten G.

⁹³ *Ibid.*

⁹⁴ Jowers, K. "Paying a Price" Air Force Times, vol. 53, no. 35, April 5, 1993, p. 47.

children, researchers found a higher rate of depression among Air Force daughters in the 12-19 age group than in their female civilian classmates.⁹⁵ Fifty-two percent of Air Force daughters reported feeling "so sad or problem-ridden that nothing was worthwhile" at least twice in the previous month as compared to 41 percent of civilian females.

Other experts disagree as to the cause of higher rates of depression among Air Force daughters. Dr. Manuel Schydlower, consultant to the Army Surgeon General in Adolescent medicine, stated that

The military is a microcosm of society. Just because a child or adolescent is a member of a military family does not mean she or he will have trouble with (mental health problems).⁹⁶

In addition, Dr. Peter Jensen, of NIMH in Washington, D.C., reports that no evidence exists that military children become more depressed or anxious than civilian ones.⁹⁷

D. EFFECT OF A MILITARY FAMILY BACKGROUND ON A MILITARY CAREER

While Defense Officials have not formally studied attitudes among children of military families, informal focus groups that included the children of veterans have shown they are more likely to be interested in military service than youths who have no family history of service.⁹⁸

In 1995, Steve Sellman, director of accession policy for the Department of Defense, reported that "... service members are our best recruiters, whether they have made a career

⁹⁵ *Ibid.*

⁹⁶ *Ibid.*

⁹⁷ *Ibid.*

⁹⁸ Maze, Rick. "Unhappy Parents Trouble Recruiters" Air Force Times, vol. 56, no. 8, September 25, 1995, p. 16.

of the service or whether they have served one tour and returned home.”⁹⁹ These statements provide support for the position that military families portray a positive image of the military to their children. This positive portrayal of the military may significantly influence the child’s attitude about the military. For example, a 1982 Air Force study found that as many as 50 percent of that service’s accessions came from families in which other members had served in the armed forces.¹⁰⁰

E. SUMMARY

There are several areas where military families and military children have been found to differ from civilian families and children. Possible causes of these differences have been identified through various studies and research projects.

For example, Carlson and Carlson found that the system of military housing has helped to create tight social circles between military families. Further, military housing units are usually located on base and therefore tend to reduce the amount of social interaction between civilian and military families. In addition, this decreased social interaction may contribute to their findings that military service members perceive that civilian society members cannot fully understand or appreciate the nature of military work and lifestyle.

The pace of the military lifestyle, such as frequent moves and deployments, may also have a significant effect upon the military family and children. Military children may experience increased responsibilities at an early age due to deployments of their mother or father. In addition, military children view the family roles of their parents differently than

⁹⁹ *Ibid.*

¹⁰⁰ *Ibid.*

civilian family children because of the frequent absences of one parent.

Differences between the educational development of DoD children residing overseas and that of the general U.S. population has also been found. The military children overseas outscored their peers in standardized testing areas for the SAT and reading levels for elementary school children. In addition, military children overseas took the SAT at a higher rate than the general population. Further, there may exist intangible benefits of growing up in foreign cultures that are difficult to assess early in life. For example, developing the skills to positively interact with a wide variety of people are useful attributes that are difficult to measure directly.

Finally, studies and surveys by the armed forces have shown that children from military families have a higher interest in the military and tend to join at a higher rate than children from civilian families. This fact is important to the Naval Academy because, in addition to academic and leadership ability, it wants applicants who desire to be in the armed forces and have the potential for a military career. A military family background may provide a valuable supplement to the results from the Strong-Campbell Interest Inventory questionnaire in assessing a candidate's likelihood of pursuing a naval career.

IV. DATA

A. SOURCE

The data used for this research were obtained from the Navy Personnel Research and Development Center (NPRDC) in San Diego, CA., and from files assembled by Reardon.¹⁰¹ The data set from NPRDC is for the Naval Academy classes of 1988 to 1992 and consists of demographic information, high school athletic and academic records, and Naval Academy performance information. Reardon's data consists of post-commissioning performance for Naval Academy classes of 1980 to 1985. His data set is used to measure career motivation and fleet performance in terms of retention rates to Lieutenant Commander and promotion rates to Commander.

1. USNA Performance Variables

The data used for examining Naval Academy performance for the classes of 1988 to 1992 were compiled by NPRDC. Table VII summarizes the more relevant data compiled by NPRDC from questions completed by the candidates during their application process.

¹⁰¹ Reardon, M.

Table VII. Description of Data for USNA Classes of 1988 to 1992.

Name	Range	Mean	Description
milfam	0,1	14%	career military family member
civfam	0,1	86%	civilian family member
naps	0,1	14.23%	attended NAPS
collexp	0,1	27.13%	prior college experience
milexpfm	0,1	62.25%	some military experience in the family
satvhi	330 - 800	580.54	SAT verbal score
satmhi	425 - 800	661	SAT math score
cisstd	0 - 826	510	career interest standard score
tisstd	0 - 772	495	technical interest standard score
nonath	0 - 800	531	point value for non-athletic ECAs
compeca	0 - 800	535	point value for competitive ECAs
atheca	0 - 800	537	point value for athletic ECAs
rc	200 - 800	589	high school class rank standard score
recs	0 - 999	876	high school recommendations std score

2. Fleet Performance Variables

Data compiled by Reardon consisted of the Naval Academy graduating classes for the period 1980 to 1985. Retention and promotion rates of military family officers were examined and military family midshipmen were identified by type of nomination received for entry into the Naval Academy. For this data set, each mean value is based upon the total number of graduates from USNA for the classes of 1980 to 1985. From this data set, approximately 40 percent of all graduates remained in the service to the LCDR selection boards, 32 percent of the graduates were promoted to LCDR and, finally, only 8 percent of

the graduates were eventually promoted to the rank of Commander. Retention to Lieutenant Commander is used as a measure of career motivation. Due to the many influences that may affect an officer's career after approximately ten years of service, the predictive accuracy of explanatory variables based on high school and academy academic information is expected to be very small, thus, a statistical analysis of retention and promotion as a function of high school and academy characteristics is not performed. For a thorough statistical analysis of the selection process to LCDR, including high school statistics, the reader is referred to Reardon¹⁰² where he reported that a military family background was statistically significant at the 0.05 level for promotion to LCDR.

B. OVERVIEW OF GRADUATION AND ATTRITION STATISTICS BY MILITARY FAMILY EXPERIENCE

1. Composition of the Brigade of Midshipmen

One of the hypotheses of this thesis is that military family midshipmen perform better at the Academy. According to the self-reported information from the candidate questionnaires, a midshipman's family background can be classified as: 1.) no military experience, 2.) some military experience, or 3.) career military experience. For the purposes of this thesis, career military experience includes midshipmen who have one parent currently on active duty at the time of application or have one parent who has retired from the military. No separate distinction was made for the amount of time in the service by one of the parents. For example, a parent who might have left the military with eighteen years of service is included in the "some military experience" category. Although this classification does not

¹⁰² Reardon, M.

accurately describe the parent's military background, it is assumed that the number of cases in which the parent has many years of service and did not retire is so small that it will not substantially change the data analysis. For example, Navy policy has generally allowed for "limited" retirements for personnel who find themselves in this situation. Figure 1 shows the overall military family experience for the brigade of midshipmen for classes of 1988 to 1992.

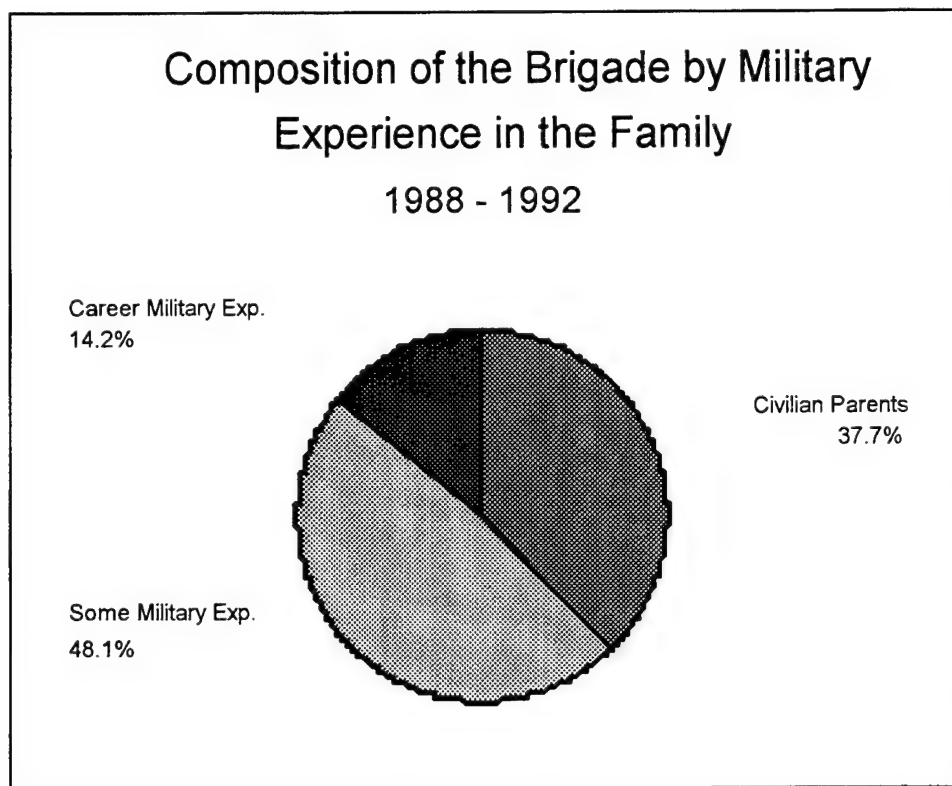


Figure 1. Military Family Experience in the Brigade.

2. Graduation Summary

This thesis investigates the effects of a military family background on midshipmen performance. Figure 2 describes the overall graduation rates by military experience in the

family for the classes of 1988 to 1992. During this period, the average graduation rate from USNA was 76.5 percent.

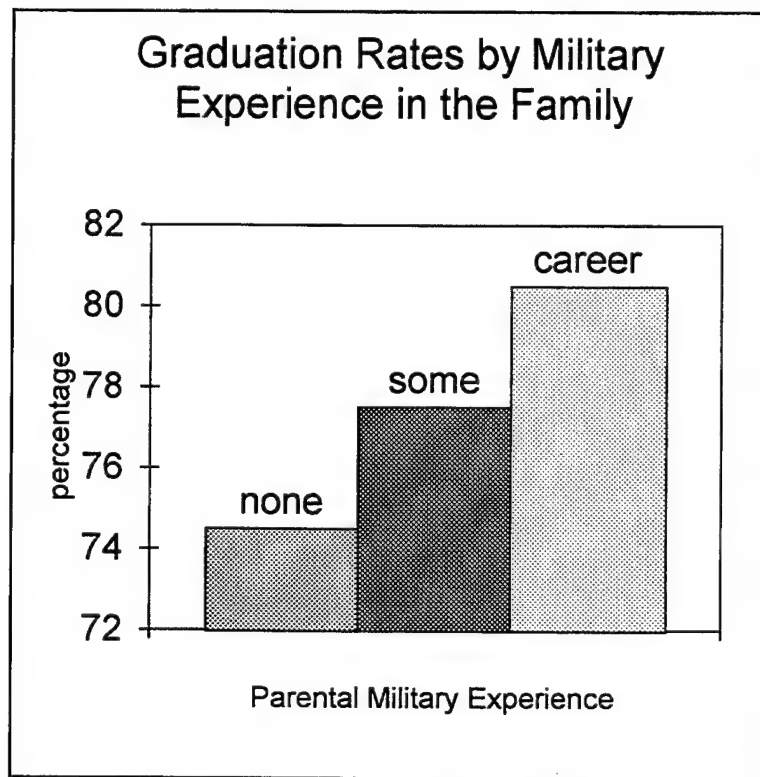


Figure 2. Graduation Rates by Military Family Experience for the classes of 1988 - 1992.

Figure 2 suggests that a military family background is a factor in predicting graduation rates. However, due to the small numbers of military family midshipmen, more analysis is necessary to isolate the effect of a military family background.

Based upon this preliminary analysis of the data, the author decided to regroup the graduation data into two categories of military families; *career* military and *civilian*.

Midshipmen whose parents had some military experience were assigned to the “civilian family” category in order to analyze the effect of a career military family background against midshipmen who did not have a career military family background. A preliminary analysis of midshipmen performance at the Naval Academy shows that midshipmen from career military families perform slightly worse than midshipmen from civilian families in terms of average whole-man multiple score, and final average aggregate multiple score. As well, their average order of merit at graduation was higher where a lower order of merit depicts better academic performance. Table VIII summarizes the differences in these average scores for the classes of 1988 to 1992.

Table VIII. Military And Civilian Family Midshipmen Performance.

	Military Family	Civilian Family
Whole-man multiple	63,141	63,519
standard deviation	3657	3904
Aggregate Multiple	1008	1024
standard deviation	132	140
Order of Merit	539	505
standard deviation	285	298

Table VIII shows that military family midshipmen enter the academy with lower average whole-man multiples and graduate with lower average standings than their peers from civilian families. The whole-man multiple average includes all additional points assigned by the admissions board. Consequently, the military family whole-man multiple average already includes additional points usually given for a military family background.

A further analysis of graduation rates was performed to determine if traits other than military family background seemed significant. Figure 3 compares the graduation rates of midshipmen from career military families and civilian families with selected other categories of midshipmen for the classes of 1988 to 1992.

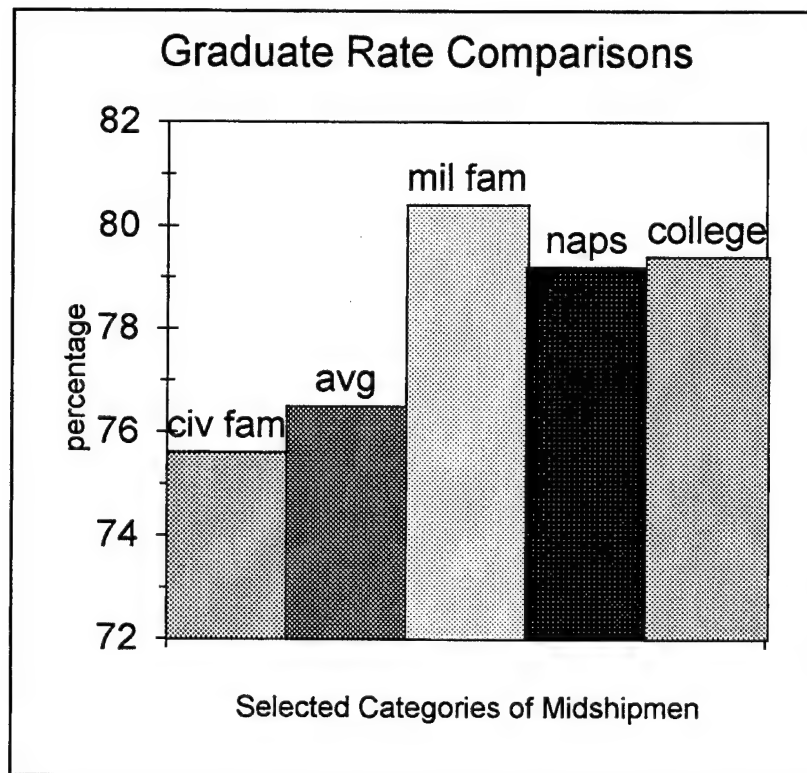


Figure 3. Graduation Rates by Selected Categories of Midshipmen for the classes of 1988 - 1992.

The military family variable appears to be related to graduation rates when compared to other categories of midshipmen. After "career military", prior college experience and NAPS were the next highest graduation groups at the Academy. Intuitively, prior college experience

should be beneficial due to an extra year of academic instruction and maturity. Accordingly, NAPS provides academic instruction and an introduction to a military lifestyle. The high graduation rate for NAPS personnel supports USNA policy of assigning all NAPS graduates appointments to the Academy.

3. Attrition Summary

A second important trait of performance at the Naval Academy is attrition information. Attrition can be divided into three major categories: 1.) academic, 2.) conduct, and 3.) voluntary. For the graduation year groups 1988 to 1992, Figure 4 tabulates the relationship between the different reasons for attrition.

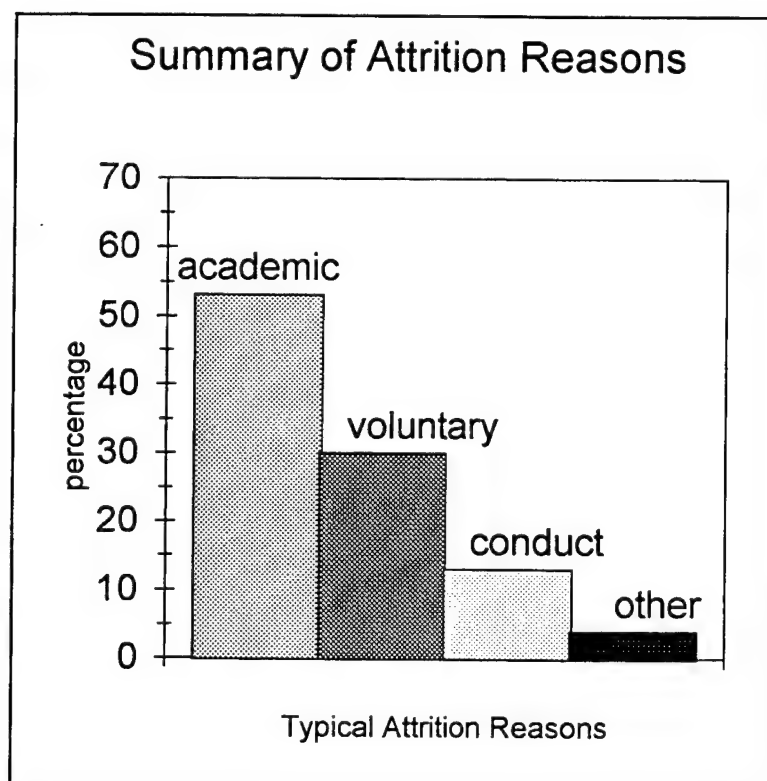


Figure 4. Summary of Attrition Reasons for the classes of 1988 - 1992.

Service academies impose more stringent physical standards and control their students' leisure time more than most civilian universities. Despite expectations that these conditions would cause service academies to experience high voluntary attrition rates, academic factors accounted for more than 50 percent of all attrition reasons for the classes of 1988 to 1992. This large share of attrition due to academic reasons supports weighting the whole-man multiple to favor academic performance of the candidates.

In order to analyze the effect of a military family background on attrition, midshipmen were again grouped into the three original categories. Those whose families had no military experience, those whose families had some military experience and those whose families had career military experience. These three attrition rates are compared in Figure 5.

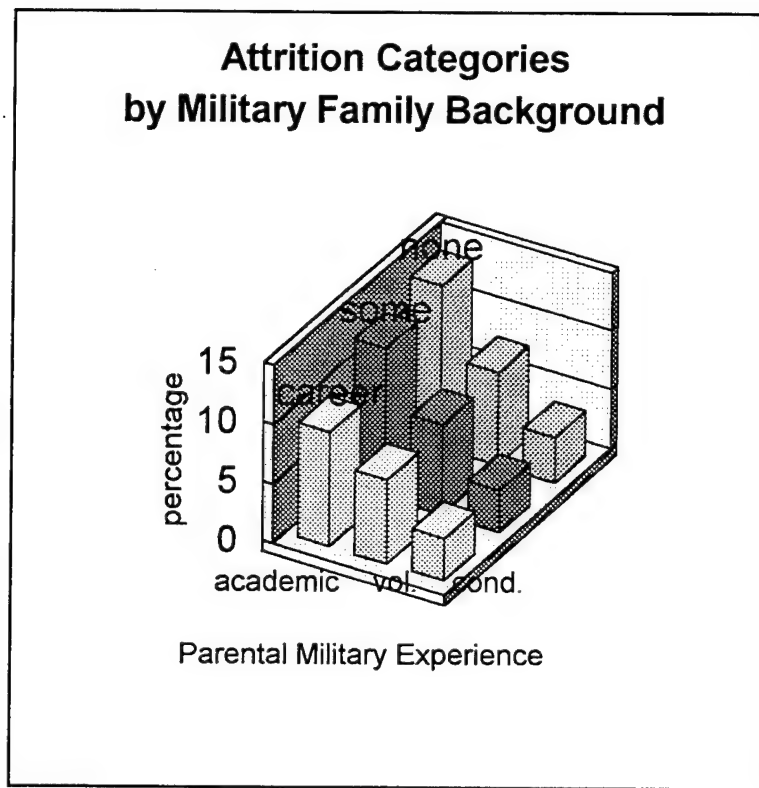


Figure 5. Attrition Reasons by Parental Military Experience for the classes of 1988 - 1992.

Figure 5 shows little difference in attrition percentages between midshipmen whose parents have some military experience and those who have no military family experience. These results are similar to the graduation rates in Figure 2, where there was little difference between civilian family midshipmen and midshipmen whose families have some military experience, not including career military family experience. Consequently, the attrition data were again regrouped into two categories: 1.) midshipmen from career military families, and 2.) midshipmen from civilian families. Midshipmen whose parents were either on active duty at the time of application to the USNA or had one or more parents who have retired from the

military were categorized as military family midshipmen as before. Again, midshipmen whose parents had some military experience were classified as civilian family midshipmen. A histogram of attrition reasons for military family midshipmen and civilian family midshipmen from Naval Academy classes 1988 to 1992 is presented in Figure 6.

Based upon the higher graduation rates of midshipmen from military families, a lower overall attrition rate is expected. However, as shown by Figure 6, the lower attrition rate was not distributed equally among the four categories. Career military family midshipmen showed a smaller percentage of academic separations than did civilian family midshipmen. This academic separation rate is much lower than the comparison between midshipmen from civilian families and midshipmen whose parents have some military experience as shown previously in Figure 5. Although military family midshipmen voluntary attrition rate is lower than civilian families, the slight difference does not support the hypothesis that a career military family background significantly lowers voluntary attrition rates.

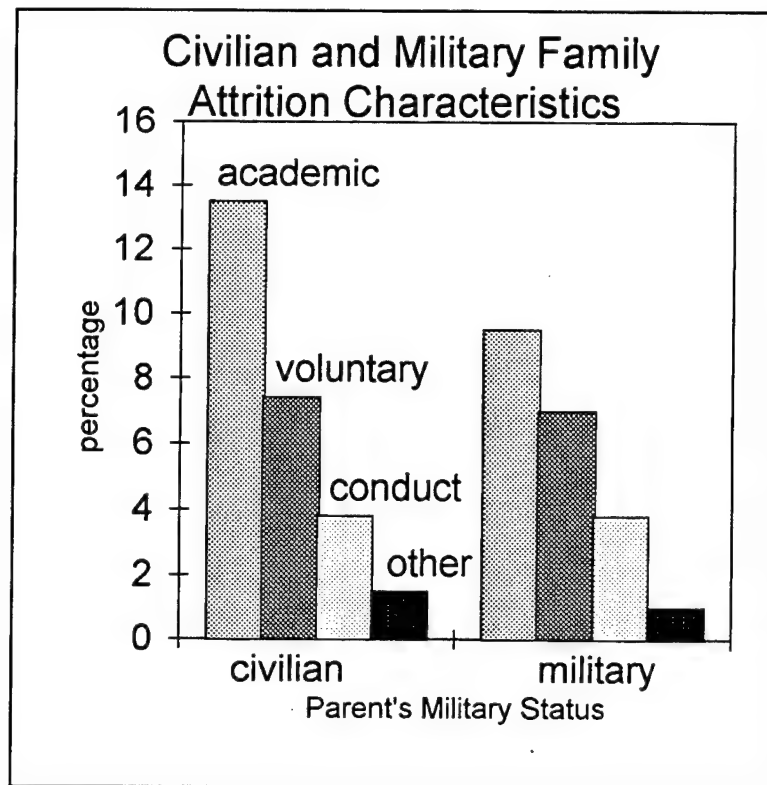


Figure 6. Midshipmen Attrition Reasons by Family Background for the classes of 1988 - 1992.

C. MODEL DEVELOPMENT

1. Whole-man Multiple

The United States Naval Academy uses the whole-man multiple system to predict success of its applicants. Table IX presents the seven criteria and the corresponding weight that are used by the admissions board to rank each applicant's record.

Table IX. Composition of The Whole-man Multiple.

Predictor	Effective Weight (percent)
rank in secondary school class	26
SAT or ACT math	24
recommendations of secondary school officials	14
SAT-V or ACT english	12
technical interest	12
extracurricular activities	8
military career interest	4

Note: Obtained from the USNA Admissions Office.

Based upon this whole-man multiple model, the following equation was developed to predict each midshipman's probability of graduation:

$$\begin{aligned} \text{graduate} = & B_1*rc + B_2*satvhi + B_3*satmhi + B_4*recs + B_5*tisstd + \\ & B_6*cisstd + B_7*nonath + B_8*compeca + B_9*atheca + e \end{aligned}$$

The explanatory variable *rc* represents the applicant's standard score for his rank in class. The standard score accounts for variations in the rank in class between high schools with large and small graduating classes. The variables *satvhi* and *satmhi* are the candidate's SAT verbal and math scores, respectively, while the *recs* variable is the standard score for the candidate's high school teacher recommendations. The variables *tisstd* and *cisstd* are the values of the Strong-Campbell Interest Inventory for technical interest and career interest, respectively. Finally, the variables *atheca*, *compeca* and *nonath* represent the candidate's participation in athletic, competitive and nonathletic extracurricular activities (ECA's) and comprise the ECA component of the whole-man multiple. As we saw earlier, the admissions board whole-man multiple formula weights academic performance (rank in school class, SAT

math and verbal scores) at approximately two-thirds of the candidate's multiple score. Finally, the variable "e" represents a random error term.

In developing an experimental model to predict USNA performance, several explanatory variables that might affect a candidate's performance at the Academy could be defined. However, this thesis purposely limits the addition of new variables in order to use only those that are available to the admissions board. Therefore, the author has chosen to add only the variable *milfam*, which represents the career military family background of each candidate, to the graduation model presented earlier.

2. USNA Graduation

Determining career path decisions of individuals who have approximately ten years or more of service becomes increasingly complex. Many personal factors such as marriage and dependent status may affect an officer's career decisions. In addition, professional factors such as designator and service qualifications become important. Service designators are the different "jobs" in the Navy. For example, supply corps, aviation and surface warfare are different designators. Each of these communities historically have different promotion rates based upon their unique needs. In addition, qualifications are career "milestones" and are specific to each community. They help determine how well the individual is advancing in relation to his peers. Constructing a model of officer promotion that includes post-commissioning variables such as these is not the intent of this thesis. A detailed analysis of officer performance with post-commissioning variables has been performed by Reardon.¹⁰³

¹⁰³ Reardon, M.

This thesis attempts to judge the graduation and career potential of officers based upon information available to the admissions board at the time of candidate selection.

During the five year period 1988 - 1992, military family midshipmen comprised approximately 14 percent of the brigade. A logit model was proposed to analyze the graduation probability of midshipmen based upon explanatory variables that comprise the whole-man multiple. A linear regression model with the same explanatory variables was also estimated in order to obtain ordinary least squares (OLS) estimates of the effect of each variable on graduation. Table X provides the logit coefficients and their significance, along with the OLS coefficients from the linear regression. The OLS coefficients are used to gauge the partial effect of each explanatory variable on the probability of graduation.

Table X. Logit Model of Graduation.

Variable	Coefficient	Significance	OLS Coefficient	Definition
rc	0.0652	0.023	0.011	rank in class standard score
satmhi	0.4251	0.000	0.075	high SAT math
recs	0.1201	0.000	0.021	recommendations from H.S. teachers
satvhi	0.0572	0.255	0.01	high SAT verbal
tisstd	0.0817	0.013	0.014	technical interest standard score
atheca	0.126	0.076	0.024	athletic ECAs standard score
compeca	0.0471	0.734	0.004	competitive ECAs standard score
nonath	0.032	0.653	0.008	non-athletic ECAs standard score

cisstd	0.0232	0.452	0.004	career interest standard score
constant	-4.97	0.000	-0.319	

The overall chi-square for the logit model was 131.323 and goodness-of-fit was 6,609. The variables *rc*, *satmhi*, *tisstd* and *recs* were positively associated with predicting graduation and were significant at the 0.05 level. Further, these same variables comprise approximately 76 percent of the whole-man multiple score. This supports the whole-man multiple as an effective system for identifying graduation potential for USNA midshipmen. The remaining variables were not significant at the 0.05 level.

An alternative model was developed with the additional explanatory variable *milfam*. A logit and linear regression analysis were performed. Again, the linear regression model provides the Ordinary Least Squares estimates of the marginal effect of each variable. Table XI lists the resulting logit coefficients and significance, along with the OLS coefficients for each of the whole-man multiple variables.

Table XI. Logit Model of Graduation with Milfam.

Variable	Coefficient	Significance	OLS Coefficient	Definition
rc	0.067	0.021	0.011	rank in class
satmhi	0.425	0.000	0.075	high math SAT
recs	0.118	0.000	0.02	high school recommendations
satvhi	0.058	0.252	0.01	high verbal SAT
tisstd	0.084	0.011	0.015	technical interest
cisstd	0.022	0.483	0.004	career interest
compeca	0.053	0.703	0.005	participated in competitive ECAs in high school
atheca	0.129	0.070	0.025	participated in athletic ECAs in high school
nonath	0.032	0.649	0.008	participated in non-athletic ECAs in high school
milfam	0.298	0.001	0.05	military family
constant	-5.056	0.001	-0.334	

The overall chi-square for the logit model was 142.9 and goodness-of-fit was 6,607. None of the coefficients in the second logit model changed markedly from their previous value. Consistent with the weighting percentages of the whole-man multiple, the variables "rank in class," "high math SAT" and "high school recommendations" remained positive and statistically significant in predicting USNA graduation at the 0.05 level. In addition, the variable *milfam* was positive and significant in predicting graduation from USNA. Table XII compares the relative impacts upon the probability of graduation for the explanatory variables

that were significant at the 0.05 level.

Table XII. Effects of Significant Explanatory Variables on the Probability of Graduation.

Variable	Probability	Mean	Max	Interpretation
rc	1.1%	589	800	rank in class standard score
satmhi	7.5%	662	800	high math SAT
recs	2.1%	876	1,000	high school recommendations score
tisstd	1.4%	495	800	technical interest standard score
milfam	5.0%	---	---	career military family background

Interpretation of the results is as follows. A 100-point increase in the math SAT score, above the mean, increases the candidate's probability of graduation by 7.5 percentage points. For the remaining whole-man multiple factors, a 100-point increase above their mean increases the probability of graduation by two percentage points or less. In comparison, a candidate's military family background increases his probability of graduation by five percentage points. Based upon the positive results of the *milfam* variable, an attempt was made to further evaluate the effect of a military family background. Logit regressions were estimated using additional explanatory variables such as prior college experience, prior military experience and NAPS attendance in conjunction with the *milfam* variable. However, these additional variables caused the coefficients in the linear regression and logit models to lose significance. The author was unable to identify subsequent explanatory variables that were significant in the graduation model. It appears that the effects of multicollinearity caused the increase in the standard errors and the lack of significance of this enhanced model.

Finally, the *milfam* variable was a significant predictor of success, but it may be capturing traits common to all military family midshipmen in addition to their military family background.

3. USNA Attrition

Logit and linear models were developed to determine the probability of receiving an academic discharge based upon the same whole-man multiple factors used in the model of graduation. The variable *academic discharge* is a binary variable in the logit model and is estimated by the following equation.

$$\begin{aligned} \text{academic discharge} = & B_1*rc + B_2*satvhi + B_3*satmhi + B_4*recs + \\ & B_5*cisstl + B_6*tisstl + B_7*nonath + B_8*compeca + \\ & B_9*atheca \end{aligned}$$

The linear regression model was used to estimate the marginal effect of each of the explanatory variables on receiving an academic discharge. After estimating both models, Table XIII summarizes the logit model coefficients and their significance, along with the ordinary least squares estimates of the marginal effects of each coefficient.

The overall chi-square for the logit model was 57.83 and goodness-of-fit was 6,596. In the previous graduation model, the *rc* variable was positive and significant in predicting graduation. However, in the academic discharge model, the variable *rc*, rank in class, is also positive and significant in predicting academic attrition. The variable *satmhi* is negative and significant in predicting an academic discharge at the 0.05 level. Although the *recommendations* variable was significant, it reduced the candidate's likelihood of receiving an academic discharge by less than 1 percentage point. The remaining variables in the whole-

man multiple model were not significant in predicting an academic discharge.

Table XIII. Logit Model of Academic Discharge.

Variable	Coefficient	Significance	OLS Coefficient
rc	0.24	0.000	0.026
satmhi	-0.202	0.005	-0.022
recs	-0.087	0.021	-0.001
satvhi	-0.036	0.571	-0.004
tisstd	-0.053	0.203	-0.006
atheca	-0.006	0.946	-0.001
compeca	-0.166	0.387	-0.018
nonath	-0.019	0.846	-0.002
cisstd	-0.045	0.246	-0.005
constant	0.439	0.559	0.389

Next, the variable *milfam* was introduced in the academic attrition model. In addition, a linear regression model was estimated to obtain the ordinary least squares (OLS) estimates of the marginal effects of each variable on the outcome. Table XIV summarizes the logit coefficients, their significance and the OLS coefficients. Again, the OLS coefficients gauge the partial effect of each explanatory variable on the probability of receiving an academic discharge.

Table XIV. Logit Model of Academic Discharge with Milfam.

Variable	Coefficient	Significance	OLS Coefficient
rc	0.238	0.000	0.026
satmhi	-0.203	0.004	-0.022
recs	-0.085	0.024	-0.009
satvhi	-0.038	0.551	-0.004
compeca	-0.175	0.359	-0.018
atheca	-0.01	0.92	-0.002
nonath	-0.019	0.845	-0.002
tisstd	-0.056	0.178	-0.006
cisstd	-0.043	0.267	-0.005
milfam	-0.409	0.001	-0.039
constant	0.573	0.446	0.401

The overall chi-square for the logit model was 70.35 and goodness-of-fit was 6,587. In all cases, none of the coefficients changed appreciably. The variables *satmhi* and *recs* continue to be significant and negative in predicting an academic discharge. Further, the *milfam* variable was found to be highly significant and negative in predicting an academic discharge. This regression supports the earlier bar graphs that showed a lower academic discharge rate for midshipmen from career military families than midshipmen from civilian families. Table XV summarizes the marginal effects of each significant variable from Table XIV for the academic discharge model.

Table XV. Marginal Effects of Significant Explanatory Variables on Academic Discharge.

Variable	Probability	Mean	Maximum	Interpretation
rc	2.6%	589	800	high school rank in class std score
satmhi	-2.2%	662	800	high math SAT
recs	-0.9%	876	1,000	high school recommendations score
milfam	-3.9%	--	--	career military family background

Interestingly, the variable *rc*, rank in class, is positively associated with receiving an academic discharge. From Table XV, a 100-point increase in the score assigned to a candidate's class rank, above the mean, indicates a 2.6 percent increase in the probability of receiving an academic discharge. This inconsistency between the graduation and attrition models suggests that explanatory variables other than the candidate's entering academic performance may be significant in explaining academic attrition. For example, some midshipmen may feel pressured to remain at the Academy despite their desire to leave. Consequently, they may allow themselves to "fail out" of the Academy instead of leaving voluntarily. Further interpreting the results from Table XV for the SAT math score, a 100-point increase above the mean indicates a two percent lower chance of receiving an academic discharge. Although the *recommendations* variable was significant, it affects the probability of receiving an academic discharge by less than one point. Notably, a candidate's military family background suggests a four percent lower probability of receiving an academic discharge. This agrees with the positive effect that a military family background has on graduation probability.

4. Fleet Performance

The data files assembled by Reardon for USNA classes of 1980 - 1985 were used to

judge fleet performance. Table XVI represents the military family background of USNA officers for the classes of 1980 1985.

Table XVI. Brigade Family Background for Classes of 1980 - 1985.

	Total Numbers	Percentage
career military family	1182	19.7
civilian family	4832	80.3

Among Naval Academy graduates for the 1980 to 1985 classes, officers from military families composed about 20 percent of the group. Because the Naval Academy invests a great deal of money in each graduate, it is obvious that if the graduate remains in the service for a career the Academy receives a greater return on its investment. Officers that remain in the service to the LCDR selection boards, at approximately the 10-year point, probably have the desire to make the service a career. Therefore, desire for a military career is measured in terms of retention to the LCDR selection boards.

Fleet performance will be measured in terms of promotion rates to LCDR and CDR. Officer promotion statistics can be measured in different ways. Career progression rates for advancement to Lieutenant Commander and Commander will be used to judge fleet performance. In contrast, the Navy selection rates to LCDR and CDR are based on the numbers of officers who are eligible for promotion at the time of the selection board. As an illustration, we will examine ten Ensigns from the Naval Academy. Suppose six Ensigns leave the navy prior to the LCDR selection board. Of the four remaining Ensigns, suppose two were promoted to LCDR. Therefore, the Navy selection rate to LCDR is 50 percent

(two out of four). However, the career progression rate to LCDR is 20 percent (two out of the original ten officers). Consequently, the career progression rate provides a more complete picture of the overall performance of academy graduates from military and civilian families.

Table XVII summarizes the retention and promotion statistics for USNA classes of 1980 to 1985. The percentages are based upon the original numbers of graduates in the USNA graduate column and therefore reflect the career progression rate of each group. Additionally, the sample sizes are included for each group.

Table XVII. Sample Sizes and Retention and Promotion Percentages for USNA Classes of 1980 to 1985.

	USNA Graduate	Retention to LCDR	Promote to LCDR	Promote to CDR
military family	-	46.9%	39.3%	11.5%
n	1,182	554	464	136
civilian family	-	38.8%	31.0%	7.3%
n	4,832	1,876	1,499	355

Interpreting the results from Table XVII, USNA graduates from career military families remain in the service at a higher rate and promote to LCDR and CDR at a higher rate. These results support the hypothesis that in terms of retention and promotion rates, USNA graduates from career military families perform better in the Fleet than graduates from civilian families.

D. SUMMARY

A process of self-selection appears to exist at the Academy. Candidates from families

with some military background comprise a majority (62 percent) of students attending the USNA. However, the type of military family background appears to be an important factor in graduation rates and attrition rates from the Academy.

Even though midshipmen from career military families typically receive additional points from the admissions board due to their military family background, these candidates still enter the USNA with lower average whole-man multiples than midshipmen from civilian families. In addition, military family midshipmen graduate with lower average aggregate multiples than civilian family midshipmen for the classes of 1988 to 1992. However, military family midshipmen maintained a graduation rate approximately five percent higher than civilian family midshipmen for these same classes.

Multivariate analysis performed here shows that the military family variable was statistically significant in predicting graduation. Further, midshipmen from career military families had a lower rate of academic attrition when compared to midshipmen from civilian family backgrounds. Voluntary separation rates revealed little difference between military and civilian family backgrounds.

Military family midshipmen appear to be winning against the odds when they graduate from the Academy. Based on their lower whole-man multiples and lower aggregate multiples, military family midshipmen would be expected to perform worse than they do. In addition to their higher graduation rates for the classes of 1988 to 1992, fleet retention and promotion data for year groups 1980 to 1985 indicate that military family midshipmen remained in the service at higher rates and were promoted to LCDR and CDR at higher rates. As discussed in Chapter II, some aspect of their military family background may be responsible for their

success.

V. CONCLUSIONS AND RECOMMENDATIONS

A. SUMMARY

This thesis provides evidence that midshipmen from military families succeed at the Naval Academy, serve longer, and are promoted at higher rates than midshipmen from civilian families. It recommends that this trait receive higher weight in the whole-man multiple.

Chapter I explained the background of the Naval Academy's whole-man multiple and discussed possible shortcomings in the multiple's ability to account for traits that are predictive of success at USNA and in the Fleet. Despite its imperfect nature, the multiple, which is validated annually, has evolved into the primary tool used by the admissions office to select entering classes.

Section A of Chapter II discussed revisions to the whole-man multiple designed to ensure that it is an effective instrument in predicting success despite academic and personal differences among the candidates. For example, when women entered the nation's service academies in 1976, the Academy asked the Navy Personnel Research and Development Center to study the multiple's effectiveness in predicting success for female candidates. Although differences between men and women were an obvious area of study, other opportunities to improve the multiple may still exist. One such opportunity may be the inclusion of a military family background. To pursue this possibility, studies were presented that show that significant differences exist in values between academy students and university students, regardless of gender. Further, given that service academies stress certain values

and morals, students with pre-existing values similar to those of the service academies may feel a stronger sense of identity than other students. This sense of identity may help these students handle the added stress and ultimately succeed at a higher rate than other students.

Therefore, Section D explores cultural differences that exist between military and civilian families. Children who grow up in military families are exposed to the military's values and lifestyle throughout their childhood and thus may be more likely to desire a military lifestyle, including attending a service academy, than children from civilian families. Once at an academy, these pre-existing values and life-style experiences gained from a military family childhood may be reinforced. Occupational inheritance, such as suggested here, would provide the military with academy students, and ultimately officers, who "fit" the military lifestyle better than others.

Finally, Section E discussed the effect of intergenerational transfer on academy candidates and on enlistments in the armed forces. Approximately two-thirds of Naval Academy midshipmen from the classes of 1988 to 1992 came from families with some military service. In addition, studies of recruit information for all branches of the military show that intergenerational linkage plays a strong part in the recruitment process. This evidence suggests that a military family background does have a positive effect on the decisions of young teenagers to either enter one of the service academies or to enlist in the military.

Chapter III discussed military family life and the special burdens and opportunities it provides for the children. Most notably, the armed forces have evolved to become a force of career oriented volunteers. Because they are volunteers, most military members must view

the military in a favorable light and this attitude undoubtedly encourages their children to have positive impressions of military service. At a minimum, children in career military families should be better informed about the requirements of military life than children in civilian families.

In addition to more familiarization with the military, studies have shown that children in military families often experience different interactions with their parents than children in civilian families. Because military deployments necessitate frequent and often long family separations, many studies have documented developmental changes that the remaining family members undergo as they compensate for the military member's absence. For example, child behavior problems increase in families with younger children while older children feel the pressure of increased responsibilities due to a parent's absence. This increased pressure has been found to be especially prevalent among teenage boys whose fathers are deployed.

Chapter IV presented statistical evidence that a correlation exists between midshipmen from military families and graduation at the Naval Academy, other things equal. For the graduating classes of 1988 to 1992, midshipmen from military families had, on average, whole-man multiples that were approximately 2,500 points, or about four percent, lower than midshipmen from civilian families. At the end of four years at the academy, midshipmen from military families trailed their counterparts in terms of average aggregate multiple and average order of merit. However, midshipmen from military families graduated at higher rates for the 1988 to 1992 graduating classes than did midshipmen from civilian families. Further, military family midshipmen had lower average academic attrition rates than civilian family midshipmen for the same five years. This evidence supports the argument that military family midshipmen

have a stronger desire to succeed at the Academy. Although military family candidates enter with lower whole-man multiples, they appear to succeed in competition with candidates who enter with higher multiples on average. In addition, multivariate analysis showed that a military family background was significant at the 0.05 level in predicting graduation from the academy and was statistically significantly in reducing the chances of an academic discharge.

Finally, approximately 64 percent of the present whole-man multiple is composed of a midshipman's academic performance in high school and on standardized tests, that is, academic credentials. This research, on the other hand, shows that an additional demographic variable may be useful in predicting success from the Academy. The analysis finds that midshipmen from military families for the classes of 1988 to 1992 entered the Academy with lower average multiples but graduated at a four percent higher rate than midshipmen from civilian families. Consequently, the predictive capability of the whole-man multiple might be improved if it took greater account of a military family background.

B. CONCLUSIONS

The Naval Academy places more demands upon its students than do most civilian universities. The ability to deal with this added stress varies from individual to individual but is fundamentally key to a midshipman's ability to succeed at the Academy. The Academy's whole-man multiple recognizes that traits other than academic ability may help midshipmen succeed at the Academy. This research has suggested that a military family background may be more important to predicting the success of midshipmen than its current weight allows.

Chapter II discussed differences between education levels, attitudes and character traits of military recruits and civilians. Therefore, several descriptive statistics of midshipmen

were used to compare graduation rates in order to explore the significance of a military family background on USNA performance. Consequently, graduating midshipmen were divided into five groups: 1.) military family, 2.) prior NAPS attendance, 3.) prior college attendance, 4.) prior military experience and 5.) civilian family. These five groups represent some of the background differences that were studied in Chapter II. For example, a candidate's prior military experience would seem to be beneficial due to the familiarity with the military lifestyle that it provides. Similarly, NAPS would be expected to benefit a midshipman due to the academic and military preparation. In contrast, prior college experience was included to contrast the value between solely extra academic preparation and the extra academic and military preparation provided by NAPS. Figure 2, on page 57, compared the graduation rates for midshipmen in each of these five categories. From Figure 2, midshipmen with military family backgrounds had the highest graduation rate, followed by NAPS graduates and then prior college or other academic preparation. Consequently, it would appear that the differences between military personnel and civilians discussed in Chapter II do have an effect upon a candidate's performance at the Academy.

Based upon the results of these descriptive statistics, multivariate analysis was performed to more accurately determine the value of a military family background upon graduation from USNA. The results from these regressions, shown in Chapter IV, demonstrated that a military family background had more relative impact upon predicting graduation than a 100-point increase, above the mean, in SAT scores. More precisely, the military family background was found to improve a midshipman's chance of graduation by five percent, holding all other factors equal.

Finally, USNA graduates' performance in the Fleet was considered. Fleet performance was divided into two categories, desire for a military career and promotion success. First, retention rates at the Lieutenant Commander boards were used to assess desire for a military career because the Navy considers Lieutenant Commanders to be a part of its career force. Second, Navy promotion records to the rank of Lieutenant Commander and Commander were used to measure promotion success.

Chapters II and III presented material that supports the notion that military family children have different values and attitudes about the military. These different family experiences may be factors that affect an officer's desire for a career and ultimately his promotion success. Based upon this hypothesis, the retention and promotion rates between USNA officers with and without military family backgrounds were compared. The statistics showed that military family officers were eight percentage points more likely to remain in the service to the LCDR promotion boards than civilian family officers. In addition, as shown in Table XVII, military family officers had a career promotion rate of 39 percent while the civilian family career promotion rate was 31 percent. As the officers progressed to the rank of CDR, military family officers maintained their promotion advantage. At the CDR promotion board, the military family officer's career promotion rate was four percent higher than the civilian family officer's promotion rate.

C. RECOMMENDATIONS

1. United States Naval Academy

Because this research has shown that midshipmen from military families graduate at higher rates and promote in higher percentages, the admissions board should consider

assigning more weight to a candidate's military family background when calculating the whole-man multiple. The goal of the Admissions Office is to pick the most qualified applicants with the greatest potential to graduate from the Naval Academy and pursue a naval career. Based upon the evidence presented, more emphasis should be placed on the military family background of Naval Academy applicants.

2. Unites States Navy

The Navy should administer questionnaires to determine the prevalence of officers and enlisted personnel who are from career military families. A review of current literature on military families and the results of this thesis suggest that a military family background has a positive impact in terms of percentages of children who follow their parents into a military career. Consequently, knowledge of military family backgrounds may have implications for recruiting efforts for both officer and enlisted personnel.

D. RECOMMENDATIONS FOR FURTHER RESEARCH

This paper has concentrated on the performance of midshipmen with career military family backgrounds at the Naval Academy. Future studies of midshipmen at the Naval Academy might include a larger number of explanatory variables in order to isolate the effect of a military family background. In addition, the whole-man multiple applies the same factors for each candidate. A further study of the whole-man multiple by ethnicity, gender, prior college experience or prior military experience may suggest refinements to the multiple to account for these differences among candidates. Perhaps it might be necessary for several whole-man multiple models to exist in order to effectively weight each factor for different groups of candidates.

A study of the social lives of officers with military family backgrounds and those without military family backgrounds may prove useful. If officers with military family backgrounds are more familiar with the lifestyle in the military, they may adapt better to military requirements and may also help their families adjust to the demands of a military lifestyle. For example, a study of active duty officers with military family backgrounds may show significant differences in marriage and divorce rates as compared to officer with civilian family backgrounds. Finally, this paper studied only officers from the Naval Academy. Future studies should include comparisons between USNA graduates and other officer accession sources.

APPENDIX A. LINEAR GRADUATION MODEL

ANOVA for Linear Regression Model of Candidate Multiple

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	23.226	9	2.581	14.814	.000 ^b
	Residual	1149.242	6597	.174		
	Total	1172.467	6606			

a. Dependent Variable: did midshipman graduate

b. Independent Variables: (Constant), NONATH, RECS, ATHECA, CISSTD, RC, SATMHI, TISSTD, SATVHI, COMPECA

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.319	.105		-3.040	.002
	ATHECA	.024	.014	.057	1.784	.074
	CISSTD	.004	.005	.010	.745	.456
	COMPECA	.004	.027	.007	.157	.875
	RC	.011	.005	.029	2.187	.029
	RECS	.021	.005	.049	3.933	.000
	SATVHI	.010	.009	.017	1.163	.245
	SATMHI	.075	.010	.107	7.646	.000
	TISSTD	.014	.006	.033	2.492	.013
	NONATH	.008	.014	.018	.557	.578

a. Dependent Variable: did midshipman graduate

APPENDIX B. LOGIT GRADUATION MODEL

Total number of cases: 6716 (Unweighted)
 Number of selected cases: 6716
 Number of unselected cases: 0
 Number of selected cases: 6716
 Number rejected because of missing data: 109
 Number of cases included in the analysis: 6607

Dependent Variable Encoding:

Original Value	Internal Value
.00	0
1.00	1

Dependent Variable.. GRADUATE did midshipman graduate
 Beginning Block Number 0. Initial Log Likelihood Function
 -2 Log Likelihood 7136.5901
 * Constant is included in the model.
 Beginning Block Number 1. Method: Enter
 Variable(s) Entered on Step Number
 1.. ATHECA, CISSTD, COMPECA, NONATH, RC, RECS
 SATMHI, SATVHI, TISSTD

Estimation terminated at iteration number 3 because
 Log Likelihood decreased by less than .01 percent.

-2 Log Likelihood	7005.267
Goodness of Fit	6609.799

	Chi-Square	df	Significance
Model Chi-Square	131.323	9	.0000
Improvement	131.323	9	.0000

Classification Table for GRADUATE

		Predicted				
		no	yes			Percent Correct
		n	I	y		
Observed		+-----+-----+				
no	n	I	2 I	1522 I		.13%
		+-----+-----+				
yes	y	I	0 I	5083 I		100.00%
		+-----+-----+				
				Overall		76.96%

----- Variables in the Equation -----

Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
ATHECA	.1260	.0710	3.1459	1	.0761	.0127	1.1343
CISSTD	.0232	.0308	.5666	1	.4516	.0000	1.0235
COMPECA	.0471	.1387	.1153	1	.7342	.0000	1.0482
NONATH	.0320	.0711	.2025	1	.6527	.0000	1.0325
RC	.0652	.0291	5.0367	1	.0248	.0206	1.0674
RECS	.1201	.0297	16.3673	1	.0001	.0449	1.1276
SATMHI	.4251	.0562	57.2189	1	.0000	.0880	1.5298
SATVHI	.0572	.0502	1.2958	1	.2550	.0000	1.0589
TISSTD	.0817	.0328	6.2037	1	.0127	.0243	1.0852
Constant	-4.9686	.6026	67.9750	1	.0000		

APPENDIX C. LINEAR GRADUATION MODEL with MILFAM VARIABLE

ANOVA for Linear Regression Model with MILFAM Variable

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	25.228	10	2.523	14.505	.000 ^b
	Residual	1147.239	6596	.174		
	Total	1172.467	6606			

a. Dependent Variable: did midshipman graduate

b. Independent Variables: (Constant), candidate's parents are either on active duty or are retired at time of application, SATVHI, CISSTD, COMPECA, RECS, RC, TISSTD, SATMHI, ATHECA, NONATH

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.334	.105		-3.185	.001
	ATHECA	.025	.014	.059	1.834	.067
	CISSTD	.004	.005	.009	.701	.483
	COMPECA	.005	.027	.008	.186	.853
	RC	.011	.005	.030	2.276	.023
	RECS	.020	.005	.048	3.858	.000
	SATVHI	.010	.009	.017	1.178	.239
	SATMHI	.075	.010	.107	7.650	.000
	TISSTD	.015	.006	.034	2.546	.011
	NONATH	.008	.014	.019	.568	.570
	MILFAM	.050	.015	.041	3.393	.001

a. Dependent Variable: did midshipman graduate

APPENDIX D. LOGIT GRADUATION MODEL with MILFAM VARIABLE

Total number of cases: 6716 (Unweighted)
 Number of selected cases: 6716
 Number of unselected cases: 0
 Number of selected cases: 6716
 Number rejected because of missing data: 109
 Number of cases included in the analysis: 6607

Dependent Variable Encoding:

Original Value	Internal Value
.00	0
1.00	1

Dependent Variable.. GRADUATE did midshipman graduate
 Beginning Block Number 0. Initial Log Likelihood Function
 -2 Log Likelihood 7136.5901
 * Constant is included in the model.
 Beginning Block Number 1. Method: Enter
 Variable(s) Entered on Step Number
 1.. ATHECA, CISSTD, COMPECA, NONATH, RC, RECS, SATMHI
 SATVHI, TISSTD, MILFAM

Estimation terminated at iteration number 3 because
 Log Likelihood decreased by less than .01 percent.

-2 Log Likelihood 6993.685
 Goodness of Fit 6607.007

	Chi-Square	df	Significance
Model Chi-Square	142.905	10	.0000
Improvement	142.905	10	.0000

Classification Table for GRADUATE

		Predicted				Percent Correct	
		no		yes			
Observed		n	I	y			
no	n	I	1	I	1523	.07%	
yes	y	I	0	I	5083	100.00%	
Overall						76.95%	

----- Variables in the Equation -----							
Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
ATHECA	.1288	.0711	3.2807	1	.0701	.0134	1.1374
CISSTD	.0216	.0308	.4918	1	.4831	.0000	1.0219
COMPECA	.0530	.1389	.1458	1	.7026	.0000	1.0545
NONATH	.0324	.0712	.2066	1	.6494	.0000	1.0329
RC	.0672	.0291	5.3319	1	.0209	.0216	1.0695
RECS	.1179	.0297	15.7297	1	.0001	.0439	1.1252
SATMHI	.4254	.0562	57.1975	1	.0000	.0879	1.5302
SATVHI	.0575	.0503	1.3106	1	.2523	.0000	1.0592
TISSTD	.0837	.0329	6.4865	1	.0109	.0251	1.0873
MILFAM	.2978	.0894	11.0926	1	.0009	.0357	1.3468
Constant	-5.0556	.6035	70.1672	1	.0000		

APPENDIX E. LINEAR ACADEMIC DISCHARGE MODEL

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.389	.083		4.700	.000
	ATHECA	-.001	.011	-.003	-.102	.919
	CISSTD	-.005	.004	-.015	-1.170	.242
	COMPECA	-.018	.021	-.036	-.836	.403
	RC	.026	.004	.086	6.506	.000
	RECS	-.010	.004	-.028	-2.271	.023
	SATVHI	-.004	.007	-.008	-.560	.575
	SATMHI	-.022	.008	-.040	-2.820	.005
	TISSTD	-.006	.005	-.017	-1.273	.203
	NONATH	-.002	.011	-.007	-.198	.843

a. Dependent Variable: academic discharge

ANOVA for Academic Discharge Model^f

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.297	9	.700	6.429	.000 ^b
	Residual	717.937	6597	.109		
	Total	724.234	6606			

a. Dependent Variable: academic discharge

b. Independent Variables: (Constant), NONATH, RECS, ATHECA, CISSTD, RC, SATMHI, TISSTD, SATVHI, COMPECA

APPENDIX F. LOGIT ACADEMIC DISCHARGE MODEL

Total number of cases: 6716 (Unweighted)
 Number of selected cases: 6716
 Number of unselected cases: 0
 Number of selected cases: 6716
 Number rejected because of missing data: 109
 Number of cases included in the analysis: 6607

Dependent Variable Encoding:

Original	Internal
Value	Value
.00	0
1.00	1

Dependent Variable.. ACDISCH academic discharge
 Beginning Block Number 0. Initial Log Likelihood Function
 -2 Log Likelihood 4986.9048
 * Constant is included in the model.
 Beginning Block Number 1. Method: Enter
 Variable(s) Entered on Step Number
 1.. ATHECA, CISSTD, COMPECA, NONATH, RC, RECS, SATMHI,
 SATVHI, TISSTD

Estimation terminated at iteration number 4 because
 Log Likelihood decreased by less than .01 percent.
 -2 Log Likelihood 4929.080
 Goodness of Fit 6595.970

	Chi-Square	df	Significance
Model Chi-Square	57.825	9	.0000
Improvement	57.825	9	.0000

Classification Table for ACDISCH

		Predicted				Percent Correct
		no		yes		
		n	I	y		
Observed		+-----+-----+				
no	n	I	5779	I	0	I 100.00%
		+-----+-----+				
yes	y	I	828	I	0	I .00%
		+-----+-----+				
					Overall	87.47%

----- Variables in the Equation -----

Variable	B	S.E.	Wald	df	Sig	R	Exp (B)
ATHECA	-.0063	.0980	.0042	1	.9485	.0000	.9937
CISSTD	-.0452	.0389	1.3484	1	.2456	.0000	.9558
COMPECA	-.1661	.1920	.7479	1	.3871	.0000	.8470
NONATH	-.0191	.0981	.0380	1	.8455	.0000	.9811
RC	.2398	.0370	41.9903	1	.0000	.0895	1.2710
RECS	-.0873	.0377	5.3524	1	.0207	-.0259	.9164
SATMHI	-.2015	.0712	8.0009	1	.0047	-.0347	.8175
SATVHI	-.0360	.0636	.3212	1	.5709	.0000	.9646
TISSTD	-.0529	.0416	1.6178	1	.2034	.0000	.9485
Constant	.4392	.7511	.3419	1	.5587		

APPENDIX G. LINEAR ACADEMIC DISCHARGE MODEL with MILFAM

ANOVA for Academic Discharge with MILFAM Variable^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.537	10	.754	6.936	.000 ^b
	Residual	716.697	6596	.109		
	Total	724.234	6606			

a. Dependent Variable: academic discharge

b. Independent Variables: (Constant), candidate's parents are either on active duty or are retired at time of application, SATVHI, CISSTD, COMPECA, RECS, RC, TISSTD, SATMHI, ATHECA, NONATH

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.401	.083		4.845	.000
	ATHECA	-.002	.011	-.005	-.151	.880
	CISSTD	-.005	.004	-.015	-1.125	.260
	COMPECA	-.018	.021	-.037	-.865	.387
	RC	.026	.004	.085	6.421	.000
	RECS	-.009	.004	-.028	-2.197	.028
	SATVHI	-.004	.007	-.008	-.574	.566
	SATMHI	-.022	.008	-.040	-2.819	.005
	TISSTD	-.006	.005	-.018	-1.326	.185
	NONATH	-.002	.011	-.007	-.209	.835
	MILFAM	-.039	.012	-.041	-3.378	.001

a. Dependent Variable: academic discharge

APPENDIX H. LOGIT ACADEMIC DISCHARGE MODEL with MILFAM

Total number of cases: 6716 (Unweighted)
 Number of selected cases: 6716
 Number of unselected cases: 0
 Number of selected cases: 6716
 Number rejected because of missing data: 109
 Number of cases included in the analysis: 6607

Dependent Variable Encoding:

Original Value	Internal Value
.00	0
1.00	1

Dependent Variable.. ACDISCH academic discharge
 Beginning Block Number 0. Initial Log Likelihood Function
 -2 Log Likelihood 4986.9048
 * Constant is included in the model.
 Beginning Block Number 1. Method: Enter
 Variable(s) Entered on Step Number
 1.. ATHECA, CISSTD, COMPECA, NONATH, RC, RECS, SATMHI
 SATVHI, TISSTD, MILFAM

Estimation terminated at iteration number 4 because
 Log Likelihood decreased by less than .01 percent.
 -2 Log Likelihood 4916.550
 Goodness of Fit 6587.080

	Chi-Square	df	Significance
Model Chi-Square	70.354	10	.0000
Improvement	70.354	10	.0000

Classification Table for ACDISCH

		Predicted		Percent Correct
		no n	yes y	
Observed	no	5779	0	100.00%
	yes	828	0	.00%
Overall				87.47%

----- Variables in the Equation -----

Variable	B	S.E.	Wald	df	Sig	R	Exp (B)
ATHECA	-.0097	.0971	.0100	1	.9202	.0000	.9903
CISSTD	-.0433	.0389	1.2344	1	.2666	.0000	.9577
COMPECA	-.1746	.1903	.8414	1	.3590	.0000	.8398
NONATH	-.0192	.0972	.0389	1	.8436	.0000	.9810
RC	.2381	.0371	41.2060	1	.0000	.0887	1.2689
RECS	-.0852	.0378	5.0727	1	.0243	-.0248	.9183
SATMHI	-.2030	.0713	8.1079	1	.0044	-.0350	.8163
SATVHI	-.0379	.0636	.3555	1	.5510	.0000	.9628
TISSTD	-.0561	.0417	1.8125	1	.1782	.0000	.9454
MILFAM	-.4090	.1205	11.5223	1	.0007	-.0437	.6643
Constant	.5729	.7523	.5800	1	.4463		

APPENDIX I. CIVILIAN FAMILY STATISTICS for 1980 - 1985

USNA Officers from Civilian Family Backgrounds

CIVFAM

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid .00	1182	19.7	19.7	19.7
1.00	4832	80.3	80.3	100.0
Total	6014	100.0	100.0	
Total	6014	100.0		

USNA Officers Who Remained to the Lieutenant Commander Selection Boards

CIVSTAY

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid .00	2956	49.2	61.2	61.2
1.00	1876	31.2	38.8	100.0
Total	4832	80.3	100.0	
Missing System	1182	19.7		
Missing				
Total	1182	19.7		
Total	6014	100.0		

USNA Officers Who Were Promoted to Lieutenant Commander

CIVLCDR

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	3333	55.4	69.0	69.0
	1.00	1499	24.9	31.0	100.0
	Total	4832	80.3	100.0	
Missing	System Missing	1182	19.7		
	Total	1182	19.7		
	Total	6014	100.0		

USNA Officers Promoted to Commander

CIVCDR

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	4477	74.4	92.7	92.7
	1.00	355	5.9	7.3	100.0
	Total	4832	80.3	100.0	
Missing	System Missing	1182	19.7		
	Total	1182	19.7		
	Total	6014	100.0		

APPENDIX J. MILITARY FAMILY STATISTICS for 1980 - 1985

USNA Graduates from Military Family Backgrounds

Military Family - by Nomination Source

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	4832	80.3	80.3	80.3
	1.00	1182	19.7	19.7	100.0
	Total	6014	100.0	100.0	
Total		6014	100.0		

USNA Officers who Remained in the Service to the Lieutenant Commander Selection Boards

MILSTAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	628	10.4	53.1	53.1
	1.00	554	9.2	46.9	100.0
	Total	1182	19.7	100.0	
Missing	System Missing	4832	80.3		
	Total	4832	80.3		
Total		6014	100.0		

USNA Officers Who Were Promoted to Lieutenant Commander

LCDRMIL

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	718	11.9	60.7	60.7
	1.00	464	7.7	39.3	100.0
	Total	1182	19.7	100.0	
Missing	System	4832	80.3		
	Missing				
	Total	4832	80.3		
Total		6014	100.0		

USNA Officers Who Were Promoted to Commander

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1046	17.4	88.5	88.5
	1.00	136	2.3	11.5	100.0
	Total	1182	19.7	100.0	
Missing	System	4832	80.3		
	Missing				
	Total	4832	80.3		
Total		6014	100.0		

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